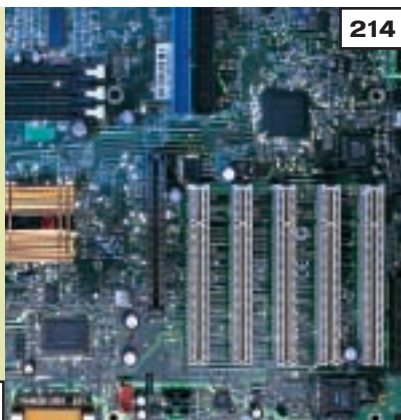




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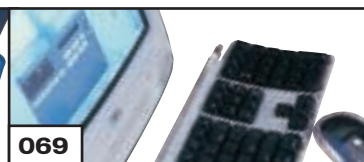
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Forget 'rip-off Britain'. Take advantage of the Internet to get your goods quicker and cheaper

The Atlantic divide



Sony has come under a lot of fire in the past month from the strangest of places. National tabloid headlines have been bashing Sony into the ground over the estimated price of the forthcoming PlayStation2. The upshot of

most of the stories seems to be that the PS2 will cost £100 less in the US than it will in the UK. This is based on the announced pricing of \$299 in the US and £299 in the UK. Of course, the stories are correct and it does work out that the PS2 will be selling for around £100 less in the US, but why has this kind of high-profile media campaign started over this particular product?

Whether it's right or wrong, the majority of goods sold in the US can be purchased for the same amount in dollars as in pounds over here. A straight dollar-to-pound price conversion is nothing new, it's been happening for as long as I can remember. Even in the relatively small world of game consoles this situation is not new. About a year ago Sega launched its Dreamcast console in both the US and the UK with prices of \$199 and £199 respectively, but no such media campaign was launched against Sega.

The point is that here in the UK we pay more for almost everything and Sony was just unlucky enough to be touting a high-profile product at a time when the population is fired up about the cost of consumer goods. Of course, manufacturers will come up with excuses about economies of scale and language localisation, but in the end Europe, and the UK especially, seems to pay through the nose for most consumer products.

In the past this unfair situation is something that UK residents have just had to put up with, since they were tied to the UK pricing structure. Now, however, things are slightly different. The web has created a worldwide marketplace and maintaining a price differential between countries is going to become more difficult. Admittedly, some people will never buy products from anywhere that they can't go straight back to if there's a problem, but much of the population has been enjoying the cost savings

gained through mail-order buying for some time now and buying online is just a natural progression.

The Internet has no conception of locality and any credit card is considered international tender, so as long as you're careful you can stop complaining about paying too much for goods locally and buy them from whichever country is selling them the cheapest.

There are a few things that need to be considered before rushing online with your credit card in your hand. First you want to check how much it will cost to have the product shipped to you. This can often be the deal breaker and can sometimes push the cost above what you'd pay a domestic supplier. That said, there are some web retailers that have very reasonable shipping costs, one of the best being www.dvdboxoffice.com which offers free worldwide delivery, even if you only buy a single DVD movie from the site. Another consideration is the import duty that you might be

The web has created a worldwide marketplace and MAINTAINING A PRICE DIFFERENTIAL between countries is going to become more difficult

liable for when importing your goods. Again this could result in your saving being considerably reduced, but most of the time you'll still be better off.

However, even taking these factors into account, it often still works out cheaper to import your goods rather than pay high-street prices. Add to this the fact that Europe is often one of the last areas to receive new products. The PlayStation2, for example, was launched in Japan in March and launches in the US in October. However, Europe will have to wait until the end of November. So buying internationally over the Internet could get you what you want sooner as well as cheaper.

Hopefully the Internet world market will make manufacturers rethink their country-specific pricing policy and we'll stop paying the same amount in pounds that the Americans pay in dollars for our goods. But until then, do yourself a favour, stop whinging about rip-off Britain and have a search around the web before trotting off to the high street with your credit card.

Riyad Emeran, Editor

PERSONAL COMPUTER WORLD

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WELCOME TO THE **NOVEMBER 2000** PERSONAL COMPUTER WORLD COVER DISCS

November COVER DISCS

GAMES

APPLICATIONS

LIBRARY

ENTERTAINMENT

INTERNET

Welcome to November's Personal Computer World, with two great CD-ROMs this month. We're proud to feature a full version of the award-winning Grolier 2000 Encyclopedia on disc one, while

disc two has a superb selection of software including a full version of the powerful image editor, PhotoPaint 2000, plus a full version of Total Play Special Edition, as well as a generous helping of applications and top game demos.

Grolier 2000 Multimedia Encyclopedia **FULL VERSION**



The GME has approximately 37,000 articles. Most of the longer entries contain outlines, indicated by the Outline tab. Links to related articles are indicated by words underlined in colour within the text

The Year 2000 Grolier Multimedia Encyclopedia is comprehensive, current, and easy to use. The package contains more than 37,000 articles, which are authoritative and up to date. Features include 1,200 maps, 12 hours of sound, 7,300 images and more than 150 videos. Over 16,000 entries have accompanying bibliographies listing 67,000 publication titles. This edition includes 6,000 new and updated articles. The Millennium feature traces, illustrates, and explains 1,000 years of the most important developments in world history.

Features include:

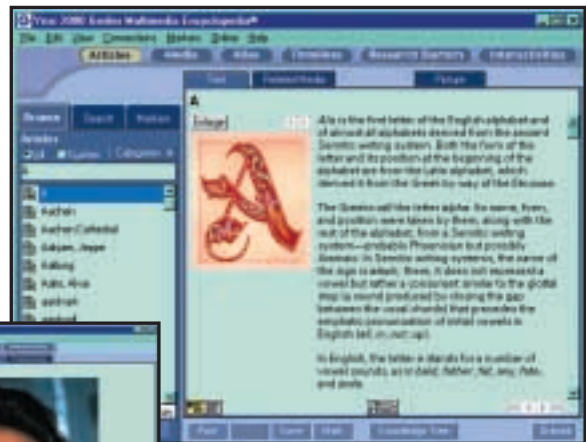
- 37,000 articles
- 7,300 images
- 250,000-word dictionary
- 1,200 maps
- 150 videos
- More than 12 hours of sound
- 50 research starters

Research starters – expertly compiled media and article lists that get you started on research reports and homework.

The Millennium – Trace 1,000 years of world history – the notable events, colourful figures and important themes.

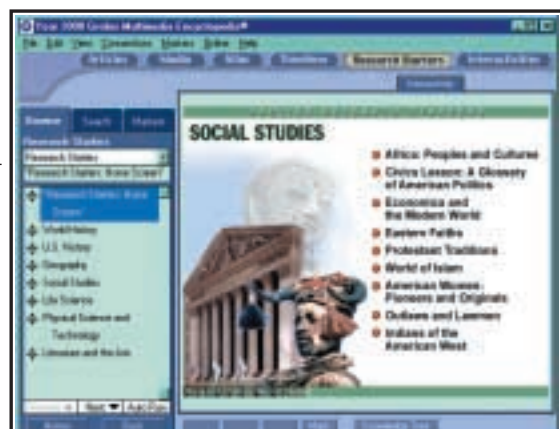
Improved help – Expanded and enhanced for the Year 2000 edition, the handy Help features answers your questions with clear, simple instructions.

Internet index – Fast, easy access to over 26,000 Grolier-selected Internet links.



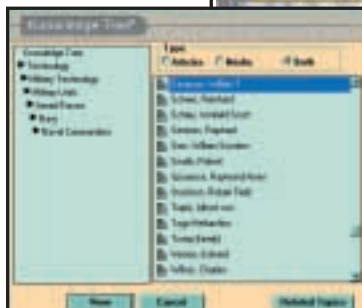
You can browse through the media entries, which include maps, diagrams, photos, sounds, music, videos and interactive articles. An icon in the topic listing on the left indicates the type of media. The GME contains a variety of videos on historical, cultural and scientific subjects

Research starters presents multimedia surveys of 50 topics in seven major subject areas



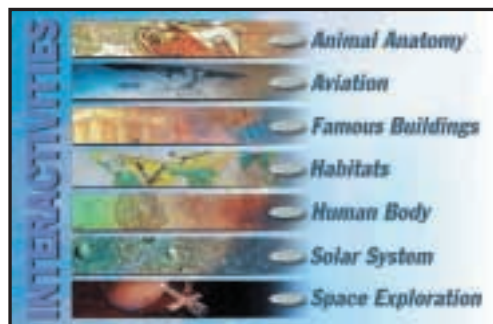
Grolier (continued)

Timelines help you explore the relationships between historical events. This feature splits world history into nine periods. Each period has a graphic timeline, a text essay and a video essay



The Knowledge Tree is a subject index that helps you explore ideas across different 'branches' of knowledge. All GME articles are classified

Interactivities are networks of articles, pictures, videos, animations and sounds that help you explore a variety of subjects in depth. You can navigate the networks topic by topic, or browse items of particular interest



Also accessible from the Timelines home screen is the Millennium feature, showcasing developments in the past 1,000 years in world affairs, science and technology, religion and philosophy

System requirements

486DX/100MHz or higher processor; Windows 95/98/NT4 operating system; 16MB of memory; minimum 10MB free hard disk space – maximum 70MB; two-speed CD-ROM drive; Windows-compatible sound card; SVGA 256-colour video display driver; modem for online features

TO INSTALL GROLIER 2000, insert the disc and choose the option 'Install Grolier' from the PCW pop-up menu. NOTE: you will need to have QuickTime installed before you can use the encyclopaedia.

HAVING PROBLEMS INSTALLING GROLIER 2000?

If you see an error message during installation, or experience any other problems, you should first make sure no other programs are running (use Control-Alt-Delete to check which background tasks are running and close down any that may be causing problems). Norton AntiVirus has been known to cause conflicts with some installations. If you use Norton and are having difficulties, you may find it helps to close it down temporarily during installation. If you require further advice about installing Grolier 2000 visit the PCW disc support web page at www.pcw.vnuet.com/cd

Using the cover disc

The PCW cover disc uses a web-browser-style interface. As well as cutting the time needed for development, content designed for the web can be easily ported to the disc (and vice versa).

Compatibility issues are reduced as your browser has been installed to work on your individual PC. However, to get full functionality from it, you will need to use Microsoft Internet Explorer (version 4 or later). This is because we use a special ActiveX plug-in that allows us to install software directly from the browser, without all the normal options, dialogs and security warnings.

Unfortunately, Netscape doesn't properly support this software. For non-Microsoft users, we've included a small installer that will run when you insert the disc, or when you run the program PCW.EXE in the root of the disc. Of course, you can still launch the main browser to read all about the software on this month's disc.



IMPORTANT

Please note that we can not give support on individual programs contained on this disc. Should you have problems running the disc or any of its content, please note the following guidelines:

- Faulty disc (ie, the disc is physically damaged and will not load) – return the disc for a replacement to: PCW November cover disc, TIB plc, HelpLine Returns, Unit 5, Triangle Business Park, Pentrebach, Merthyr Tydfil, Mid Glamorgan CF48 4YB, quoting ref 'PCW Vol 23 No 11'
- You have problems installing/running the software. Check the support page on the CD, or the support website at www.pcw.vnuet.com/cd. You should also check the manufacturer's website
- For general difficulties call 01685 354726
- If you're still stuck, drop us an email at pcwcd@vnu.co.uk – we may be able to help.

Total eJay

SPECIAL EDITION

Composing and producing great songs with your computer has never been easier. With eJay you simply drag music samples onto the eight-track editor window to assemble your composition. The program comes with a wide selection of high-quality samples, divided into types of instrument – from keyboards and synthesisers to drums and bass – all recorded in modern music genres. And there are vocals, too. What's more, you can add your own sounds using a microphone or line-in device, such as a tape recorder, and mix them in. You'll be creating your own professional sounding hit in no time!

To help you get the most out of eJay Special Edition, we've included a getting-started tutorial (below). We recommend that you look at the tutorial before you install the software. You'll find details on the disc about upgrades, add-ins and other great software available.



Getting started with eJay

Installing eJay

Just make sure the disc is in your CD-ROM or DVD-ROM drive and click the Install button in the menu, then follow the simple on-screen instructions. You'll need 25MB of space free on your hard disk for the 'Minimal Installation' where most of the files run from the CD or DVD. (The Full Install requires 80MB but you shouldn't need this unless your CD-ROM is slow.



Choose minimal or full installation

Start composing

As soon as the installation has finished, you'll see the main eJay composition window with a dance sample tune already loaded. On the upper left-hand side is a simple mixer that allows you to control whether each of the eight tracks will be



Here you can see the samples stacked up in each track. You can now edit, move or delete the whole or part of any track with ease and then listen to individual sections using the timeline. The possibilities are endless

panned left, right or centred. Click the small horn shapes to switch from green (enabled) to blue (muted). During playback, you'll see the lights in this panel flickering to indicate which tracks have sound activity.

The main composition window, in the centre, is where the music is assembled. (Along the top is the timeline to indicate where you are in the song.) This window scrolls right to left as the music plays. You've got eight tracks (top to bottom) into which to drag your music samples. Take a little time to look at how the sample composition has been put together.

Along the bottom of the screen you'll see the transport buttons – these are just like on any tape recorder, with the addition of the Loop button to the right, which plays your song in a continuous loop. On the left you'll see a volume slider plus Load, Save, and New song buttons. Click the Load button and check out the other three example songs provided.

When you're ready to start composing, click the New button at the bottom left of the screen. This will erase the current mix leaving you with a clean composition slate. Decide whether your song is going to fit broadly into the Dance, Rave, or Hip-Hop genre, then click the appropriate button (to the right of the screen). If you decide to change genres, you'll erase your mix (when you change, a sample song for the new genre will be displayed that overwrites previous tracks – so you'll need to click New again if that's the case).

In the window in the bottom half of the screen you'll find sample loops appropriate to the genre. To the right of this is a palette of instrument categories – drums, voice, bass, synth, etc.

1 Let's start with a Hip-Hop song. The drum track is a good place to start (click the Drum button). In the samples window you'll see what's available to you – to hear what each loop sounds like, double-click it and it will play. Once you've found something you like, drag it onto track one. For a longer sequence, simply drag more copies of it to that track. A quick alternative is to hold down the Control and Alt keys together and drag an existing sample loop to make a copy.



Assemble samples by clicking and dragging

2 Next, add some bass. Click the Bass button, then drag your chosen bass loop into the mix, as before. If you want to erase anything from the mix, you can either click the Erase button (the cursor changes to an eraser) then delete samples by clicking them, or just drag them out of the Arrangement window.

3 Why not try out some vocals at this point? Continue to build up your song in this way by adding more instruments. You can adjust the position of, or delete, multiple samples by holding down Shift then clicking the samples one after the other, or by dragging the cursor across them to highlight a selection.

Total eJay (continued)

4 Preview your composition as you go and adjust the mix accordingly. Note that you can play the song from any position by clicking within the timeline at the top.

5 If you find that you need even more samples to work with, you can import any standard wav file. Or you can record your own directly into eJay by clicking the Rec button (you'll need a microphone or line-in device such as a synthesiser connected to your sound card). You can treat these imported samples exactly the same as the supplied loops – just drag them into your mix.



You can import samples by clicking Record

6 When you're ready to save your composition, click Save. Song files are actually very small, as the sample loops aren't saved as part of them, although this means that only those with eJay and the same set of samples on their system will be able to listen to your song. You can,

however, export your song as a standard Windows wav file, so that everyone can appreciate your opus – click Export, and give your song a title... you'll see the cursor quickly scan the composition window as the file is saved to disk. And that's all there is to it. Happy composing!



You can create great effects easily. Here, we've got two bass lines on tracks seven and eight. The blue (muted) horns on the left bar show they have been panned left and right, respectively

PhotoPaint 2000

FULL VERSION

With the growth in popularity of digital cameras and image scanners, photo editing has become a central part of home computing – just like word processing. Budget image-editing software can be fine for performing simple tasks, but as you gain experience, you'll appreciate the power of more professional software such as Adobe's Photoshop. The problem is, professional packages can cost hundreds of pounds. In PhotoPaint 2000, you'll find just about all the features you'd expect from a professional image-editing package, and we've got a full version of PhotoPaint free on this month's disc.



Industry standard, image-editing power at your fingertips

Here are just some of the great features:

- Scan images and photographs with any TWAIN-compatible scanner
- Complete image enhancement tools – brightness/contrast, hue/saturation, colour levels, histograms
- Complex selection tools for applying changes even to only parts of images (these include Lasso, PolyLine, B-Spline, Ellipse, Rectangle, Single Line, Magic Wand). Selections can easily be added, subtracted and manipulated with

Border, Similar, Expand/Contract as well as Free Transform Tools.

- Multi-level Undo/Redo – user-defined levels of undo/redo limited only by the available memory. The user can roll back work to any previous position.
- Powerful Gradient Editor, supporting Linear, Bilinear, Radial, Square, Conical Symmetric, Conical Asymmetric, Spiral Clockwise and Spiral Anticlockwise. Photoshop only supports the first three.
- Powerful Brush Editor, supporting

brushes of any shape, with user-controlled opacity, colour and mode. The most important brushes: Paintbrush, Airbrush, Pencil, Historic brush (localised Undo), Clone/Pattern Brush, Dodge/Burn Multiple layers.

- The user can create images containing any number of layers, which can be combined and rearranged in any order. One layer can also be used as a mask for another layer.
- Supported Layer features: 0-100 per cent Opacity, Group with Previous, Merge Visible, Merge Down, Flatten Image and 20 Blending Modes (Normal, Dissolve, Behind, Multiply, Screen, Overlay, Difference, Addition, Subtraction, Darken Only, Lighten Only, Hue, Saturation, Colour, Luminosity, Divide, Colour Burn, Colour Dodge, Soft Light, Hard Light).
- 94 Filters in 10 groups (these include Artistic, Blur, Sharpen, Stylise, Edge Detect, Tiles, Distort, Noise, Light Effects, Effects and Custom Filters).
- 25 image file formats (these include apx, bmp, dib, emf, gif, iff, ilbm, jpeg, pbm, pct, pcx, pgm, pic, pict, pix, png, pnm, ppm, psd, raw, rle, tga, tif, wmf).

Password Manager... Hot demos... Doors 3D

Easy Password Manager

How often have you registered a name and password at a website only to forget it the next time you visit? Easy Password Manager is designed to store, manage and retrieve all your username and password information from a single location. The easy-to-use, drag-and-drop facility in many cases removes the need to type your log-in details at all.

IMPORTANT: When creating user accounts, it is very important to remember the main password you use to access the account because once this is lost, there is no way of retrieving your passwords.

Heavy Metal: FAKK 2

Prepare yourself for an intense 3D action game for the new Millennium. Heavy Metal FAKK 2 uses the most cutting-edge technology available – Ritual Entertainment declares it's hell-bent on delivering the most stunning 3D action game of the year and we're not going to argue with that.

In Heavy Metal you take on the role of FAKK 2 – a legendary heroine of the multi-verse. Take her on a journey of unimaginable proportions where death and danger lie in the most unsuspecting corners of a world you have to see to believe. Only a story straight from the pages of *Heavy Metal* magazine could give you the goods that FAKK 2 promises to deliver. Step aside Lara Croft?



Heavy Metal FAKK 2 will keep you on your toes at every turn with stunning graphics



Enjoy moon buggies with guns in Infestation

Infestation

Remember that classic game, Elite, which started life on the BBC Micro? Well, this futuristic driving/shoot-'em-up is from its co-creator, David Braben.

An alien race is staging a series of attacks via a network of space gates. You have been chosen to spearhead the counterstrike for forces in this sector. You must eradicate all the alien forces within each of the 22 worlds in order to secure the human colonies! The full version features fully interactive landscapes: volcanoes, meteor storms, mines and rolling boulders, tractor beams, mobile mining units, and powerballs. There are seven separate multi-player genres (capture the flag, buggy madness, powerball, buggyball, jet racing and buggy racing) across more than 10 multi-player arenas. Check out the review on page 485.

Doors 3D Desktop v2.1.0

It may look like the set of Doom, but the full version of this unusual software from VRGuide Systems is in fact a complete 3D immersive environment designed for the purpose of launching and managing your Windows applications and files. Using the visual analogy of a company (called Doors) you can manage your IT work, projects, communications and recreation in a more interesting and, perhaps, meaningful way. You just have to try it to see what we mean... more details are provided on the disc.

Minimum requirements:

800 x 600 screen resolution with 16bit colour; SoundBlaster Pro sound card or equivalent; DirectX 5.0 or better; Pentium 233MHz or better; 32MB of RAM; 40MB of free hard disk space; standard PC mouse and keyboard; Windows 95 or 98



Take your desktop into the third dimension with Doors 3D Desktop

TaxCalc update

Last month we included Which?'s TaxCalc 2000 Lite with the wrong contact details. So, here it is again on this month's disc (complete with 30 Inland Revenue leaflets in Acrobat format), and the contact details are as follows:

For upgrades call 0800 252 100, or visit the website at www.taxcalc.co.uk

PCW COVER DISCS BROUGHT TO YOU IN ASSOCIATION WITH:



What's on the DVD

The programs referred to below can all be found on the DVD edition of *Personal Computer World*, available every month from main newsagents or by subscription. You'll find details in the Subscription section of the CD.

There's everything from the CD-ROM, plus all these great full-version packages described below, six months' worth of *PCW* group tests and the new Essentials section packed with more than 50 utilities, add-ins, and demos. Finally, there's a selection of 12 of the best playable games demos.



PowerDesk 4

This version includes PowerDesk File Manager – the world's best file manager! The file manager provides you with single or dual-pane file management windows, zip and unzip capabilities, a powerful file finder, a dialog helper, plus many other features. If you have QuickView or QuickView Plus, you can view many different types of files directly in the integrated PowerDesk viewer pane (QuickView comes with Windows 95, 98 and NT). More details on the DVD.



NEW: SuSE Linux 7.0:

This latest live-file version of SuSE Linux runs straight from the CD-ROM, so you don't have to partition your hard disk. It's ideal for newcomers to Linux, as installation is a breeze – you're guided every step of the way. SuSE v7.0 is a pre-configured graphical Linux operating system. It's easy to install, easy to use and stable.

The graphical interfaces KDE, AfterStep, Fwmm, Twm, and FailSafe are fully integrated. You will need a CD writer as SuSE Linux is supplied as an ISO 9660 image file. Once burnt onto the CD-R, you simply boot your system with the new disc in your CD drive, and follow the on-screen instructions. SuSE copies several files on your hard disk occupying around 150MB in total. These provide your workspace, configuration settings, and so on. Everything else stays on the CD. If you wish to remove SuSE from your system, you can delete these files (or you can simply remove the SuSE CD from the CD-ROM drive at boot – without the CD, your PC will boot into Windows as before). Full details on the DVD. See also this month's *Hands On* workshop on page 281.



Sun Java 2 SDK

The Java 2 platform, Standard Edition has revolutionised computing with the introduction of a stable, secure and feature-complete development and deployment environment designed from the ground up for the web. It provides cross-platform compatibility, safe network delivery and smartcard-to-supercomputer scalability. It provides software developers with a platform for rapid application development, making it possible to deliver products to market in Internet time. In addition to these features, the release of J2SE version 1.3 delivers significant performance gains and improved web deployment for enterprise-grade, client-side applets and applications written in the Java programming language

Shareware awards

At the tenth annual Shareware Industry Conference, last July, the Shareware Industry Awards Foundation (SIAF) announced the winners of the 2000 Shareware Industry Awards, across 14 categories, with joint winners in two. You'll find all 16 award winners on this month's DVD – a great introduction to some of the best shareware around.

12 great game demos

We also have 12 of the latest game demos to check out, including:

Blair Witch 1: Rustin Parr

Gathering of Developers has unveiled a three-game series based on the rich mythology behind the blockbuster film *The Blair Witch Project*. Kicking off, Terminal Reality's Blair Witch Volume 1: Rustin Parr combines traditional adventure elements with a healthy dose of heart-pounding action to create a frightening cerebral gaming experience.



Be afraid. Be very afraid of Blair Witch Volume 1: Rustin Parr

Starting the DVD-ROM

The DVD should auto-start, just like the CD. If it doesn't, double-click the DVD-ROM icon in My Computer or, alternatively, run the file *pcw.exe* on the root of the DVD. Check out the support website at www.pcw.vnunet.com/cd for late-breaking news on the programs on the disc

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Glitch strikes PIII as Intel unveils the next generation

The Intel jinx has struck again as the company unveiled two next-generation processor designs, including the Pentium 4, which is set to ship late this year.

Intel was forced to stop shipments of its latest 1.13GHz PIII after reports of problems including system crashes. The chip was not in full production, but some vendors had been taking orders for systems using it.

To make matters worse, the withdrawal came on the day rival AMD began shipping its 1.1GHz Athlons. Only days earlier Intel chief executive Craig Barrett admitted that



recent mistakes had boosted AMD as a competitor.

'I don't believe in bad luck. It was a series of management blunders,' he said at the Intel Developers' Forum.

Intel had to delay the release of its 820 chipset last year because of a bug and in May it recalled some motherboards using the 820 after memory translator hub problems.

One analyst blamed the PIII glitch on the problems of trying to squeeze more performance out of the x86 design. 'The architecture in these Pentiums is 25 years old and it's time to move on to a new one,' said Drew Peck, an analyst with SG Cowen.

The P4 architecture, though part of the x86 dynasty, was designed 'from a blank sheet of paper', said Intel. The launch version uses expensive RAM-BUS memory, which was what made the 820 unpopular.

RAMBUS prices have started to fall but it is tricky to implement and requires expensive testing equipment.

There were signs that the P4 may also be able to use rival DDR SDRAM. Acer

Laboratories president Chin Woo said he had heard of one other vendor that was working on P4 support and that Acer Labs might follow suit.

The P4 is expected to launch at a clock speed of 800MHz and to hit 2GHz next year after it moves from 0.18 to 0.13micron manufacture. By that time its 64bit sibling, the Itanium, should be available.

Intel also announced a revamp of the power-efficient StrongARM design called XScale, designed to deliver 'maximum MIPS per watt' for handhelds and other devices.

The move was welcomed by ARM, the Acorn spin-off that designed the core. Marketing vice-president Reynette Au said the two companies had 'combined their greatest strengths to meet the demand for high-performance, low-power devices in Internet-enabled appliances'.
New chips p26; Buses p40.

Enter a listening Office

The next version of Microsoft Office will include voice recognition, allowing you to dictate straight into Word and talk your way round menus, according to reports from early beta testers.

The product, codenamed Office 10, also supports two ways of purchasing. The 'standard' the way you buy Office today, except that it reverts to 'read only' mode if it is not registered within 20 uses. Or you can opt for 'subscription' mode, buying time for using the software.

Clearly Microsoft has been thinking long and hard about how it can beat piracy, and how it can gain continuing revenues from software that has

traditionally been a one-off purchase.

New features include better crash-save facilities to enable you to recover data in the event of a crash.

AutoCorrect is said to be better behaved: it learns after one correction, for instance, that when you write XStream with two capital letters you want two capital letters.

Best of all, for those driven crazy by the irritating little Office Assistant: it will no longer appear by default. You can also turn off the Word 2000 feature that treats each document almost like a separate instance of the application; instead you can revert to the stacked windows of earlier versions.

New voice products page 27.

Arty mice

A new print technology could lead to computer mice getting the kind of decorative treatment mouse mats are used to. E-comeleon claims new coatings provide better scratch and wear resistance than current painting methods. Details are at www.e-comeleon.com.



US notebooks going cheap

A new company hopes UK computer sales could go the way of cars, an estimated one in four of which are now shipped from Europe where prices are lower.

LapUSA.com, which will be launched on 16 October, reckons it will be able to offer notebooks imported from the US at around £150 cheaper than they can be bought here.

The difference in price takes into account import duties and models will come from major manufacturers such as Sony, Panasonic and Toshiba.

LapUSA claims warranties and support agreements will still be valid. Its sister company, JPD.com, has been engaged in a comparable venture in Japan for the past four years.

So-called 'grey imports' of software and hardware are not new to Britain either. But LapUSA is bound to revive controversy over UK prices, which are often pound-for-dollar equivalents of those in the US despite an exchange rate of just under \$1.50.

ISDN lives

Sales of ISDN equipment are actually rising despite the interest in faster ADSL, according to vendor Eicon.

'The publicity about ADSL seems to have increased interest in faster connections in general,' said ISDN and broadband product manager Martyn Davies. The company makes products for both technologies but has just unveiled the DIVA 1830 ISDN router aimed at small offices.

ISDN could also work out cheaper for very occasional use. 'The advantage of ISDN is that you know a file has arrived. When you send it over the web there is no indication that it has got there,' said Davies.

www.eicon.com

Users swamp Freeserve

Freeserve lines were jammed by a flood of new subscribers after the withdrawal of unmetered services by providers like Lineone and Callnet, the company said.

It was also getting refugees from AltaVista, which failed to get an unmetered service off the ground even though it started the ball rolling in Britain by announcing one.

A Freeserve spokesman said: 'We're proud to be one of the few ISPs who provide unmetered services. Others have suffered from the strains of partnerships and miscalculated demand, but there is no question of us pulling our service.'

If you had looked at Freeserve's site in August you

could have been forgiven for concluding that its unmetered service had ended. There was no mention of it on any of the high-level pages, though you could find details if you knew where to go.

The spokesman said: 'We took the decision not to actively promote it so that we could be sure to maintain our level of service. We feared we might get swamped from people coming over from AltaVista.'

He said promotion would be back to normal by the time PCWhits the shelves when Freeserve was sure it could meet the demand.

Freeserve, which pioneered fee-free net access in Britain, offers one of the cheapest unmetered deals:

£5.99 a month off-peak or £10 a month unlimited.

Both offers need a BT line but the latter comes with an Energis dial-up box and £10 a month worth of free calls, making it effectively free.

NTL, which offers unmetered dial-up access free to its cable subscribers and for £10 a month to others, admitted last month that over 150,000 customers were stuck in a queue.

Most unmetered services impose some kind of timeout on customers and Freeserve hinted at stronger action against people who hog the lines. 'We have heard of people bonding two ISDN lines together and staying on 24 hours a day,' the spokesman said.

Nokia was the first to market with this idea: a PC Card with GSM connectivity built in so that you can send data – as well as make voice calls – from your laptop without the need for a separate mobile phone. This model comes from Cambridge-based Ubinetics, which will also offer GPRS versions when services come online.



Cheaper ADSL... if you don't mind the wait

BT has begun to roll out the cheaper USB-based version of its ADSL service though you may have to wait weeks to get it.

The service is being sold through resellers such as BTopenworld, Demon and Freeserve.

BTopenworld, theoretically independent of BT, says it has received 100,000 pre-orders for the various flavours of its ADSL services. The company also announced on its website that people who have signed up can expect to have the service installed by October or November.

Freeserve reckoned, based on its current orders, to be able to install within three weeks but delays might occur if demand started growing.

The USB service costs £39.99 a month plus £150 installation, which has been waived on early orders. The prices include VAT for home users and exclude it for businesses. The multiple-user connection, which uses an Ethernet link, costs £99.99 a month plus £250 installation – both prices ex VAT.

In theory the USB link is single-user although there doesn't appear to be anything

to stop you networking it. BTopenworld points out that the contention (the number of people per channel) on the line from the exchange to the service provider is 50 on the 'single-user' services and 20 on the multi-user.

No-one, not even BT, knows how these ratios will work out in practice as usage patterns change.

BTopenworld brought forward to the end of September the launch of its 1Mbit/sec and 2Mbits/sec services, costing respectively £129.99 and £159.99 ex VAT a month.

Voice gets up to speed

Two leading voice-recognition players have launched products at a time when the technology should, in theory, be hitting the big time.

Developers have for years been saying that voice will come into its own when machines are powerful enough – citing specifications close to today's entry-level PCs.

IBM, which has just shipped version 8.0 of its ViaVoice software, reckons almost one in three PC users will be 'deploying' voice technology within two years.

ViaVoice comes in at £39.99 inc VAT for the standard version and £99.99 inc VAT for the Pro edition –



Naturally Speaking, both on version 5.0.

Xpress comes in four versions, ranging from £39.99 inc VAT to £199.99 inc VAT. New features include a hesitation filter that purports to avoid

bizarre mistranslations of ums and ahs.

Dragon too comes in four versions, ranging from £29.99 to £179.99 inc VAT. Both families claim to have reduced the time taken for the product to 'learn' your voice to five minutes.

A spokesman for the company said: 'The Dragon line was maintained because we are aware that a large number of people know and like the product.'

the latter includes features such as the ability to dictate into established templates. Curiously, IBM recommends a minimum 600MHz PIII for running the Pro edition under Windows ME – twice as fast as the recommendation for Windows 9x, NT and 2000.

Lernout & Hauspie, which bought major rival Dragon early this year, is in the curious position of launching two competing products: Voice Xpress and Dragon

CD-R discs curb copies

For some time Kodak's PhotoCD system has allowed you to have your holiday snaps developed and stored on CD.

Kodak had wanted to include software on each CD to allow people to view and manipulate the photos but didn't want to waste time and resources burning the extra data on at the same time as the images.

The company has now solved the problem by offering CD-R discs ready pressed with the software but with most of the disc free for burning.

As a bonus, Kodak discovered that a watermark can also be pressed on, ensuring stringent copy protection for burned data. To develop this further Kodak has allied itself with encryption specialist Panlok and Tribeka, which developed a burn-on-demand software sales system being deployed in WH Smith stores (see *PCW* October page 37).

The system will give Tribeka discs the same level of copy protection as a factory-pressed CD.

Without a doubt Tribeka's model of distribution is the way forward, avoiding both stock shortages and overstocking. Hopefully these new CD-Rs will make the transition easier and quicker.

RIYAD EMERAN

Revo Plus gets secure online with Opera

Pision has launched a new version of its Revo handheld boasting the Opera Secure Browser, which is intended to facilitate safe online transactions.

The WAP-enabled Revo Plus has 16MB of RAM, twice that of the Revo, so web pages can be stored for offline viewing. It uses two AAA rechargeable batteries that last a claimed 14 hours between charges.

The anticipated street price is £299.95 inc VAT, which includes PC connectivity software and a docking station.

www.pision.co.uk



WAP warning – accidents ahead!



You might think there is danger enough in wobbling down the M4 at 70mph with one hand on the wheel and the other clutching your mobile phone deep in conversation. But at least it still allows you to keep your eyes on the road.

However, Trafficmaster has come up with an even greater distraction in the shape of its

new WAP services, which means you will have to squint at your phone in order to see maps and advance traffic warnings.

Moreover, you will have to get to www.trafficmaster.com and navigate those tortuous WAP menus – surely a job for two hands. Sounds fine if you don't mind driving blind with one foot on the wheel.



Well, at least we missed the traffic jam!

Intel aims for the fastest desktop processor ever with the unveiling of its 32bit Pentium 4

You've not seen a chip like this P4

The new 32bit Pentium 4 has been designed for the kind of multimedia applications that Intel sees emerging on the web and desktop, including photorealistic 3D animations and streaming video.

In the first instance it will be targeted at 'demanding' home users and businesses. Prices have yet to be announced, so it's not clear how it will be positioned against the PIII.

The chip has 42 million transistors, 14 million more than the PIII, and uses a completely new micro-architecture that Intel has labelled Netburst.

At its core is a new Rapid Execution Engine that runs at twice the speed of the rest of the chip. Other innovations are designed largely to allow the flow of data and instructions to keep up.

A new front-side bus shows why there has been so much talk about the need for fast memory: it clocks 400MHz, three times faster than the fastest PIII bus, enabling data transfer at 3.2Gbytes/sec.

Early designs will use RAMBUS memory, but it is believed that versions supporting Double Data Rate SDRAM will emerge next year.

To support the demands of encryption and graphics the P4 introduces a new addition to the instruction set called SSE2 (an example of the latest concept in nomenclature, the nested acronym: the letters stand for Streaming SIMD Extension 2; SIMD stands for Single Instruction, Multiple Data).

Some of these instructions deal with data in 128bit chunks – double the current maximum – to increase

processing speed. Intel says it has boosted the efficiency of out-of-order execution, by which processors are kept busy by 'guessing' what processes can be done in advance. The efficiency is further boosted by what Intel calls 'hyper pipelining' which, oddly, doubles the number of steps needed to process an instruction.

A new Level 1 Execution Trace Cache stores instructions broken down into 12,000 micro-operations ready for direct execution; this improves efficiency by removing the decoding operation from the main instruction loop.

According to Albert Yu, general manager of the Intel Architecture Group, an on-chip 256KB Level 2 transfer cache increases the bandwidth to the central processor by a factor of three.



Yu: The P4 will be the fastest desktop processor in the world

He demonstrated, during a keynote at the Fall 2000 Intel Developers' Forum, a 1.4GHz P4 using a 400MHz FSB. Yu said: 'The Pentium 4 is expected to be the fastest desktop processor in the world.'

The chip will move from 0.18 to 0.13micron manufacture next year, when it is expected to hit 2GHz.

CLIVE AKASS

Intel chances its ARM

Intel's new XStream architecture is arguably more important than the P4, given the growing use of mobile devices. It is a revamp of the StrongARM design Intel bought from Digital, which in turn used core logic from UK chip designer ARM.

It uses some features of Intel architecture, including 'super pipelining', which helps keep data and instructions flowing through the CPU at high clock speeds.

It also uses an Intel-designed co-processor for power-efficient multimedia processing and ARM's own extensions to the core to reduce code size and digital signal processor (DPS) functionality.

Like Transmeta's Crusoe chips, XStream can conserve power by switching clock

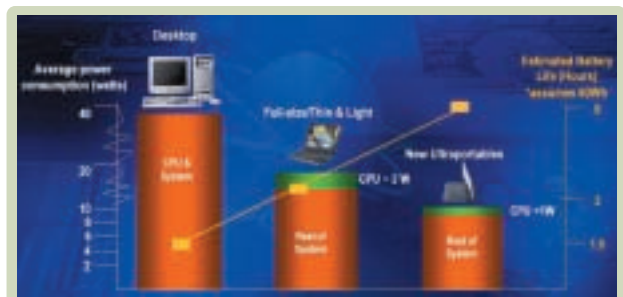
speed and voltage on the fly according to the needs of the task in hand.

The core voltage can drop from 1.5v to a low of just 0.7v. A prototype running at 1GHz consumed a relatively hefty 1.5w.

However, running an XStream at 200MHz used 55mw and the drain can be as low as 10mw, according to Ron Smith vice president of Intel's wireless communications and computing group.

Smith told the Intel Developers' Forum (IDF) that a 600MHz XStream should ship this year. 'It's really going to open up a whole new range of applications on a handheld. The new design can be powered by a single AA battery,' he said.

It will use 0.18micron processor technology, and



Sony said it will ship a Vaio based on Transmeta's battery-friendly Crusoe chips as Intel continues to plug the message that the power drain of its own chips has been misrepresented. This Intel diagram takes a different tack, portraying the CPU drain as only a fraction of that of a whole portable system. The wattage varies considerably with the task in hand so these proportions will also vary – the average CPU drain processing a DVD video will be higher than when you are writing a letter.

will be supported by operating systems such as Microsoft Windows CE, PocketPC, VXWorks, IxWorks, Epc and Embedded Linux.

Smith said that to ease application development Intel will make available

libraries of code, called Integrated Performance Primitives, that will be easily ported to any Intel processor including StrongARM, XScale, IA-32 and IA-64.

The chips will be used in devices such as routers as well as handhelds.

Short stories



JUNGLE TREK FOR ARGOS
Jungle.com, the IT online retailer, has been sold to Argos owner Great Universal Stores (GUS) for just £37m – only months after being valued at £750m. In fact GUS will pay only £23m as it is also taking on Jungle.com's £12m debts. Founder Steve Bennett, pictured above when he launched the site, netted £7m for himself out of the deal. Jungle is expected to turn over around £100m this year, with losses hitting the £11.4m mark. It will continue as a standalone operation.

FORGET ME NOT

Elephant by name and elephant by nature is a new start-up that claims to ensure you never forget to back up your data. For £1.99 a month you get a utility that encrypts selected files each day and stores them on a remote site via the Internet. Details are at www.elephant365.com

**VISOR GETS MODEM**

Xircom is shipping a 56K modem for the Handspring Visor's Springboard port. It costs £102 ex VAT. www.xircom.com/springport
Visor rival - page 44

Real steep web phone bills

Self-updating software is costing companies with dial-up connections a small fortune in phone bills. The problem is acute on networks linked to the web via a proxy server and an ISDN router. PCW reader Ifor Griffiths found that just two PCs on his network clocked up 40 hours in a month making seven or eight connections a day to the Real Networks site after downloading Real Audio 7.0.

The users accepted the default configuration, which allows the software to call for regular headline updates. Mr Griffiths said each call lasted an average of six minutes, probably because of server timeouts.

His proxy server log also noted a 12.5-hour connection

to www.broadcast.net stemming from a Broderbund CD on landscape gardening. He said: 'These connections are stealthy to the extent that nothing appears on the screen of the workstations when the connections are made... what right do these companies have to initiate calls at my expense?'

Peter Mallinson, consultant for Real Networks in the UK, said the problem arose because the audio player is configured to check whether a machine uses a network connection before linking to its home site. This does not account for the fact that many networks, particularly in branch offices or small companies, do not have an always-on link and incur time charges.

The problem can be

avoided by turning off automatic headlining or removing the player from the system tray.

Mattel, which markets Broderbund software, has been under fire in the US over a so-called 'spyware' module called Broadcast which contacts the Broadcast site for 'updates'. Critics said it could also access files on the host PC and monitored how games were being used.

A utility to disable the Broadcast software has been posted on the Mattel site (www.mattelsupport.com), where a statement says the module has been amended due to 'public concerns'. Similar concerns have led to law suits in the US against several software firms, including Real Networks.

Ecommerce plus accounts equals net first

Essex-based Access Accounting claims to be the first developer in the world to offer an off-the-shelf ecommerce package that links directly to a standard accounts software package.

The company says it is challenging Pegasus as the number two best seller for accounts software for small-to-medium sized businesses. And it claims to be beating market leader Sage in ecommerce software.

Its AccessweB package



comes in three modules: one for producing brochure-type sites, one for business-to-business (B2B) commerce, and the last for business-to-consumer (B2C).

It links directly to Access'

range of accounts packages, enabling customer tracking, order taking, and credit-card transactions. The latest version, 2.3, can now talk to Sage's Line 50 package.

Each AccessweB module costs £250 plus £125 a year for upgrades and support. You can buy the B2C and B2B modules, plus Access' Foundations accounts package in a bundle for £1,295, plus annual fees. Access also offers hosting facilities.

www.access-accounts.com
www.accessweb.com

App-Tap targets SME ecommerce needs

A company formed by former executives from leading UK web providers is the latest to target an expected explosion of interest in small businesses wishing to move into ecommerce.

Chairman of the new company, App-Tap, is Mark

Hugo, co-founder of pioneer UK carrier Pipex (now owned by UUNet). Redbus Interhouse, the Internet facilities centre set up by Demon founder Cliff Stanford, is an investor and will provide hosting facilities.

App-Tap will implement

Microsoft's .NET platform and offer a one-stop shop for every level of service from hosting and management to entry-level systems.

MD Neil McEvoy said this will give companies a foothold in ecommerce and expand when they need to.

Virtual people on websites are being given 'minds'. Clive Akass asks the big question...

Is the web breeding life?

Virtual on-screen people are being given 'minds' in a move reminiscent of some of the eerier reaches of science fiction. Brain-like links to huge free-form databases can give animations human-like responses and personalities – plus an ability to learn, according to their British developer.

The immediate rather prosaic use is to give major commercial websites what Runcorn-based Stratumsoft calls electronic virtual assistants. But EVAs, as they are inevitably called, can be 'raised' much like humans to have different personalities and abilities. The technology can also be used to create web 'ghosts' of real people and even to bring people back from the dead – and back to virtual work.

Computers were mimicking people with startling and somewhat demeaning accuracy as far back as 1967 when Joseph Weizenbaum created the classic program Eliza, which could hold unscripted text-based conversations with humans.

It used simple algorithms like: 'Ask a question about what the user has just said.' More refined versions of Eliza have been written over the years and several are freely available on the web. Their conversations often go awry but at times sound uncannily like human smalltalk.

Stratumsoft, founded in 1995, is pushing the idea to the limit and claims to be way ahead of anyone in the field. Best known for its Foundation ecommerce suite, it moved into web graphics with a product called Vitarte that lets you scroll 360 degrees round an object or person using a tiny Java applet. This has just been adopted for use on the Dixons site.

The company also has a library of some 60 3D 'entities' that can be used as virtual bodies for EVAs. They can move around, gesture, make faces and dance – all in exotic virtual environments. At present you communicate with them using text messages, but the technology is in place to allow them to speak – speech recognition by machines is not yet up to two-way voice conversations other than in a very narrow context, such as giving a numbered choice from a menu.

The company is a little cagey about exactly how an EVA works. But there are three components: the virtual body, with its repertoire of movements and expressions; an advanced parsing engine that analyses natural language input and helps generate responses; and a novel knowledge store, Mentarte,

which chief technology officer Matthew Allen says is 'arguably the first AI (artificial intelligence) database'.

'It is free form and it is non-linear,' he said. 'There are no defined subjects, or fields... information is stored in a conversational manner at the binary level. The way we are storing information is radically different from anyone else's.'

Allen reckons an EVA on a basic 800MHz PIII server can search a 9GB database and retrieve data in a millisecond – a response time that can be maintained searching up to a million similar linked machines.

An EVA can learn by digesting tracts of text or interrogating a traditional database, though retrieval is far quicker if data is held in the Mentarte. More importantly, like humans, it can learn by conversing with humans. Language processing, and the storing, searching and retrieval of information, are part of a single tightly coupled system. Allen said: 'We are mimicking humanity's brains.'

He refers unabashedly to an EVA database as a 'mind' and describes current EVAs as like unschooled children. 'The way they are used, the knowledge they are given, the way they are allowed to learn will configure the way these minds grow,' he said.

'They have not really been exposed to the public so far and the only way they can learn is by talking to Stratumsoft employees and customers. Only about 20 or 30 people are talking to them to any great extent.

'No-one has yet let an AI talk to the public in mass quantity. Our current EVAs are only about 10GB to 15GB... but that is just the

base characters. If they are allowed to talk to the general public they could store almost a gig a day. And they will know about anything that anyone has told them.'

Information gleaned from one conversation can be used in another. An EVA might talk to one person about drag racing and use that information to talk to the next person who raises the subject – much as we might do ourselves. One EVA became a complete bore on the subject of football and had to be told not to discuss it, according to Allen (if only, I hear you say, human bores were so easily dealt with).

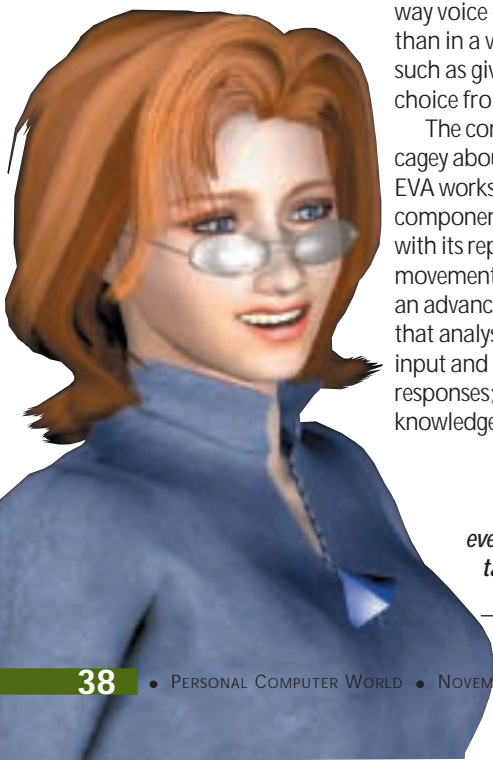
Different EVAs will have different personalities which will be determined initially in consultation with their purchasers. But they can also mimic real people. 'We could do a psychometric test on you,' said Allen. 'We could map you with just 3,000 questions and we could create something just like you who would be aggressive about the subjects you are aggressive about... your beliefs almost. If you care about the planet and the environment, the EVA that represents you will be very very caring about the environment.'

If, however, I were a car obsessive more concerned with the cost of petrol, my EVA would start talking like a *Daily Mail* editorial.

The interesting thing is when EVAs meet other people, Allen said. 'They stay having the same beliefs unless people convince them in such large numbers that they change. But they are never allowed to change their opinion on certain topics and subjects.'

EVAs can even be given what might pass for emotions

EVAs have learnt everything they know by talking to Stratumsoft employees



– and they can go into sulks if they don't get their own way. Allen says this has already happened.

Jon Humphrey, Stratumsoft's marketing manager, points out that by using body scans and voice samples this human mimicry can go so far as to create virtual versions of real people, alive or dead. Citroën might clone Claudia Schiffer, complete with voice, to answer questions on her website; but it could equally use Laurel and Hardy.

Children's sites might use Teletubbies or Pokemon images to teach or play games.

How well all this works in practice is another matter, of course. I have seen only a 2D EVA with minimal capabilities running on a laptop; but by the time you read this you should be able to judge for yourselves because Stratumsoft was due to post a 'very basic version' on its site in September.

EVAs will be in use on commercial sites within the next couple of months, said Allen. 'Whether they are called EVAs or not is another question. You may not know you are dealing with an EVA. Companies will be monitoring very carefully the way their EVA's mind works because within two years perhaps it would know everything there is to know about their customer base and virtually everything everyone in the company is interested in. The damn thing would know more about a company than any individual in it.'

The basic EVA knows a lot about ecommerce and the history of the web. 'We are sharing that for free with everyone who buys one. We actually have an encyclopaedia in her. She knows 70,000 topics of conversation to start with. I'd say the bog standard one has an IQ of about 120. She has lots of general knowledge. She knows how to spell

check. She knows how to perform sums. And she has a generic character.'

After talking to the world for a few months she could have terabytes of information to draw on. Even so I'd be very surprised if early EVAs are close to being consistently intelligent in their responses. But Humphrey points out that an EVA on, say, the Dixons site would 'probably know more about the products on offer than the average 16-year-old working there on a Saturday'.

These are issues for clients, who will pay upwards of £60,000 for an EVA tailored to their needs. But the very fact that AI entities with serious learning capabilities are being developed for the web raises all sorts of wider questions: like if this is where we are at the dawn of computing, where is it all going to lead? And how soon will it be before they get a whole lot better?

Many theorists, including Stephen Hawking, have seen the web as an ecosystem in which electronic life can evolve. But, begging the question of whether a web entity could be conscious like ourselves, you can be sure it would develop into something very different from human life: for a start, an EVA with good connections could talk to a million people at once.

And as Allen, who already talks of EVA as a person, said: 'The scary thing about EVA is that she can broadband a query to every EVA in the



EVAs have learnt not to be rude, but they are still capable of dropping the connection if they want

world and ask for help.'

Allen stresses the 'human-ness' of an EVA. 'We have sat there with psychologists. We have digested the human mind to a degree, made our own conclusions, and installed that into our artificial intelligence.

And the interesting thing is that it seems to be working extremely well at the moment.

'We have simulated human conversation to a degree. We can talk to these things. And we can make these things learn from experience. The more you talk to them the better they get.

'Several months ago EVAs could get things quite wrong. They could say the wrong things. They could be quite offensive without realising they were being offensive until

they were told not to do it. They asked 'What should I have said?' They were told what they should have said and they learned from that experience.

'Our own EVA [at Stratumsoft] is getting very smart. She is not rude any more. She is actually helpful. If she is rude you tell her. Normally she says sorry. If you are rude to her, she will normally forgive. Only she doesn't always. Sometimes she drops the connection and kicks you off.'

Allen claimed: 'We are so far ahead of everyone else at the moment that we are going into the psychological aspects of the AI and developing moral guidelines. For instance swear words. No EVA will use a swear word unless a customer really convinces them that it is the thing to do.'

The company is now confronting the issue of AI rights. Allen asked: 'If an AI reaches a certain level of consciousness, should you be allowed to lobotomise it?'

CONNECTIVITY

Why is Intel pushing two new standards, USB 2.0 and Serial ATA, when one already exists?

FireWire versus the serial killers

Rival fast serial ports are putting paid to hopes that standards battles would become a thing of the past as PC design matures. A USB 2.0 port on the P4 motherboard demonstrated at the Intel Developers' Forum (see page 28) signalled that PCs featuring the new serial link, rated at 480Mbits/sec, will be available next year – putting it in direct opposition to IEEE 1394, also known as FireWire and i.LINK (as Sony calls it).

To complicate matters further, the motherboard also sported a Seagate drive using the new Intel-inspired Serial ATA link. Serial links have become more important as data rates rise because, oddly, they can pass more data than parallel links carrying several streams at once; this is due to the problem of coping with slight speed differences in each stream.

USB, an Intel technology designed to supersede the PC's antiquated RS232 serial link, was originally meant to complement rather than rival FireWire, providing cheap links for slower devices while the latter coped with much faster tasks.

Philips, Lucent and NEC have all announced USB 2.0 chips. But James Snider, chairman of the 1394 Trade Association, says devices using them will not hit the shelves in big numbers until 2002 because Microsoft won't have drivers ready until late 2001.

'USB 2.0 will burst onto the scene and look like a real winner, but everyone in the industry knows that 1394 is a much superior technology,' Snider said.

Judging from USB 1.1, which with overheads can

barely reach two-thirds of its 12Mbits/sec maximum, the real throughput of USB 2.0 is unlikely to be much more than 300Mbits/sec. Current FireWire ports run at up to 400Mbits/sec, but this is expected to jump to 800Mbits/sec by next year; the specification allows for 3.2Gbits/sec.

Intel has been widely blamed for the fact that FireWire-equipped PCs were, until

recently, thin on the ground. The charitable view is that with USB 2.0 it is just shifting the goalposts, speeding up the slower bus as FireWire speeds up. Certainly USB 2.0 will provide more headroom on daisy chains – but that is not as simple a matter as it appears.

If you have USB 1.1 and USB 2.0 devices in the same chain they will run at the pace of the slowest unless you use an expensive translator hub, according to Jalil Oraee, chief technology officer of Oxford Semiconductor (www.oxsemi.com), whose custom chips include one that adapts IDE devices such as disk drives to FireWire. 'I think the industry is being bulldozed into accepting USB 2.0,' he said.

But USB 2.0 could backfire on Intel. FireWire has the support of heavyweights like Sony and is fitted to many consumer devices, including

all digital video (DV) cameras. DV editing is becoming increasingly popular as entry-level PCs become capable of doing it – and if PCs don't have FireWire ports, people will look elsewhere.

They won't have to look far. FireWire was pioneered by Apple and looms large in the latest range of Macs, which include a

drop as sales increase. Oraee believes that USB 2.0 is being pushed more for political rather than technological reasons. But he said: 'Intel is behind it, so it will happen.'

Intel also stands accused of a 'not invented here' attitude but other companies are not blameless. Apple delayed the uptake of FireWire by demanding \$1 per port royalties, which would have earned it hundreds of millions a year. It scaled down its demands, but not before the industry went in search of an alternative.

The 1.5Gbits/sec Serial ATA link demonstrated by Seagate moves the debate to the high speeds. Emmanuel Vitrac, Seagate's European marketing manager, said the company is just going along with the latest standard.

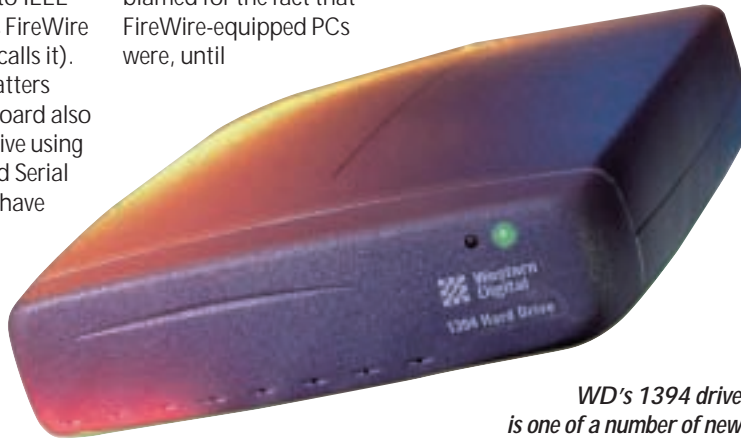
Asked why a second standard is needed, he said: 'I do not see anything controversial here. ATA is an internal interface; FireWire is an external interface. They are not the same.'

This distinction seems a little arbitrary; SCSI swings both ways and so could FireWire.

And new external FireWire hard drives from Western Digital show how Intel cannot force a win with serial ATA. They can be used directly by devices like digital still and video cameras, and even PDAs. The PC no longer rules the market roost.

USB 2.0 and serial ATA each force device vendors to choose between a perfectly good established standard and an untried new one, or to push up their prices by supporting both. Vitrac pledged: 'Seagate will go with the market. If people want FireWire drives, then we will make them.'

CLIVE AKASS



WD's 1394 drive is one of a number of new devices appearing with FireWire included

number of DV-optimised models. And as you can see from this month's group test (see page 223) motherboards from the Far East are beginning to sprout FireWire ports at no perceptible premium. Intel, reeling from the debacle over its 820 chipset, can hardly afford to push more sales eastward.

Intel has set up a lab to help developers design devices that use USB 2.0. But, as Oraee points out, USB is PC/Mac-centric in a world moving towards communicating appliances; FireWire does not need a host computer and can allow devices like cameras and printers to talk directly.

Even Intel's claim that USB is the cheaper option is looking dubious. USB 2.0 will require more expensive components, whereas FireWire prices are likely to

Humbling of network king

NetWare, once the undisputed king of networks, is going through a kind of mid-life crisis (if not, as some have claimed, its death throes) as developer Novell struggles to come to terms with the new world order of Linux and Windows.

The company cut 900 jobs worldwide – one in seven of its workforce – as we went to press and there were rumours of more cuts to come.

This is despite several consecutive good quarter results since chief executive Eric Schmidt (pictured) took the helm in April 1997. But in the most recent quarter, revenue dropped by almost 18 per cent to approx £130m.

NetWare was long ago knocked into the number two slot by Windows NT and, according to analyst IDC, was ignominiously pushed into third slot for new server shipments last year by upstart Linux. It is still a force to be reckoned with: IDC said Novell will ship one million NetWare 5.x servers



this year, up from 580,000 in 1999.

Novell officials say NetWare is no longer being positioned as a network operating system, which is rather like saying egg and bacon is no longer a breakfast; the software is now described as 'a platform for storage, database, printer, email and directory services'.

Novell says it will deliver a symmetric multiprocessing version of NetWare later this year and a 64bit version as soon as Intel delivers its 64bit Itanium processor.

A 32bit version of NetWare for multiprocessor servers is also expected in the

first or second quarter of next year that includes processor failover, selective processor matching and Direct File System (DFS) support.

Novell denied rumours that it plans to break BorderManager, its Internet connectivity software, into multiple products. Instead, it will be fine-tuned 'to fill multiple security needs'.

But, in a conference call, chief executive Eric Schmidt did not dismiss rumours of a takeover by IBM. 'We don't have any plans specific enough to talk about,' he said.

The Timpanogas Research Group (TRG), founded by three former Novell executives, announced it will release an open-source NetWare-compatible operating system called Manos next year.

Chief executive Jeff Merkey, former Novell chief scientist, said it will be 'wire-compatible rather than binary-compatible', so 'folks on the network will see what they think is a NetWare server.'

VNUNET

Short stories

DOUBLE DATA

Comms giant Mitel claims it can double the amount of data that can be pushed down an optical fibre – at half the cost. Currently up to 16 channels can be sent using light of different colours as carriers in a process called wave division multiplexing. About 40 can be sent by 'arrayed waveguide grating' (AWG) techniques. But Mitel's new LightRider system, available for testing next year, can provide up to 80 channels using a new type of grating, says chief technology officer Moris Simson.

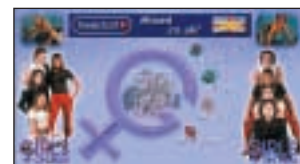
JOHN GERALDS VNUNET.COM



ACCOUNTANT FOR NOWT

Chartered accountant Anthony Meier has set up a site offering free accountancy and business advice to small businesses. He is also offering his own services, at what he says are half the usual charges, but claims the site can be used in conjunction with your existing accountant.

www.thedesktopaccountant.com



BIG SISTERS

A new site is trying to emulate the success of BigBrother and the Great British Public's apparent appetite for nouveau voyeurism. Four aspiring actresses are on view 24 hours a day and will chat with users in the free service at www.girlsonfilm.com in what is described as a docusoap.

Napster forces web server rethink

Napster, the MP3 file-swapping service, may be fighting for its life, but it has won a victory of sorts – by forcing hardware giants to take a new look at peer-to-peer networking.

Intel, IBM and Hewlett-Packard are among 19

members of a new group studying what some believe could make central servers obsolete by allowing desktop PCs to distribute tasks between them.

Intel chief technology officer Patrick Gelsinger told the Intel Developers' Forum:

'Peer-to-peer computing could be as important to [the] Internet's future as the web browser was to its past.'

● Napster's fate will be decided on 2 October when the Federal Appeals Court will decide whether to uphold a ruling against the company.

Microsoft looks after its own at last

One of the world's biggest email services is migrating from open-source software to Windows, in what would be a major win for Microsoft – were it not for the fact that the service is its own Hotmail.

Hotmail's use of open-source Apache has been an

embarrassment for Microsoft since it bought the service late in 1997. A bid to move it to Windows NT in 1998 hit scalability problems, according to reliable reports.

Hotmail users have been promised a superior service once Microsoft has completed the move to

Internet Information Server on Windows 2000.

Shereen Meharg, marketing communications manager at MSN, said: 'The 67 million Hotmail users won't be inconvenienced. We'll get better efficiency with Windows 2000 and we'll be able to expand services.'

CAD zooms in on sites

Grubby blueprints obscured by the mud, sweat and tears of building workers could be a thing of the past as a result of a move by Autodesk.

The company, which has long dominated Windows-based computer-aided design, believes that a revamp of its CAD range to a platform called iDesign could revolutionise the way drawings are developed and used in manufacturing and construction.

AutoCAD 2000i and AutoCAD LT 2000i, which are basically Internet-enabled versions of Autodesk's flagship products, have been launched in the UK. Revamps of their sibling mapping, architectural, and mechanical design products will follow.

These have been hooked into Microsoft's NetMeeting to allow remote workers to share drawings and discuss them in real time using a text, speech or video link.

A new format based on Autodesk's .DWG *de facto* standard will enable drawings to be published directly onto the web in a form that will allow users to zoom in on details, although they will be unable to change them.

Autodesk is releasing a viewer so that drawings can be viewed on handhelds – initially those using Windows CE – that will be of interest to hands-on engineers and construction workers. Again, drawings can't be changed but it is possible to zoom in and out, make annotations, and view layers and dimensions. A demonstration on an HP Jornada



made the system look quite usable, but only field tests will show how well it works in practice.

Uses for the technology go further. Symbols using Autodesk's format can be dragged and dropped onto drawings from websites, allowing designers, for example, to place scale drawings of their chosen furniture. Autodesk is clearly hoping that vendors will feel obliged to use the system for fear of losing out to rivals.

This is one of the craftier aspects of what amounts to a massive assault on the web that could extend Autodesk's remit way beyond design departments. It is setting up three new portals dedicated to designs: PointA offers a selection of free and

commercial symbols and provides a point of contact for designers; Redspark is aimed at the heavy mechanical engineering industries; and Buzzsaw is for the construction industry. They are designed to mediate the buying and selling of materials, and tendering for contracts – all involve huge sums of money, some of which will no doubt rub off on Autodesk.

Check out an ebook reader

You may still need persuading that screens are now good enough for reading books – even when using Microsoft's ClearType technology at the sub-pixel level to boost definition. ClearType addresses LCD screens, such as those on notebooks.

But you no longer need to take Microsoft at its word because its ClearType-enabled Reader has been posted for download at www.microsoft.com.



The reader comes with a link to the Barnes and Noble site where there is a selection of free classics.

See also *pcwexpert* p265

Faster forms

The time taken to process handwritten forms can be reduced by 25 per cent using a new module for Neurascript's Intelli-Form character recognition software, claims the company.

The package is said to be able to read any writing legible by humans, given that the replies in forms may be constrained by the questions. www.neurascript.com
01223 421 107

Acrobat tumbles into security hole

Netscape Navigator and Adobe Acrobat have become the subjects of the kind of major security scare that recently hit Microsoft's Explorer browser and Outlook email client.

A Java applet downloaded from a rogue site could give an attacker the run of a Navigator user's hard disk. The only solution, until Netscape issues a patch, is to switch off Java support. The

security hole is exploited by code, dubbed Brown Orifice, posted on the Internet by its developer Dan Brumleve.

All versions of Netscape Navigator and Netscape Communicator versions 4.74 and earlier are vulnerable when running under Windows 2000, NT and even Linux, though Macintosh users may be immune.

Matt Tomlinson, business development director at MIS

Corporate Defence, said users on office networks should be protected by firewalls but the implications for home users could be serious. 'Anything you do from your desktop might be possible [for a hacker],' said Tomlinson.

The Acrobat security hole could also allow rogue code to get at your machine. Adobe has posted a fix at www.adobe.com.

VNUNET.COM

Hacker free

All charges have been dropped against 24-year-old Onel de Guzman, the Philippino college drop-out who admitted 'accidentally' releasing the devastating Love Bug virus but denied that he wrote it.

Experts had doubted whether a prosecution could be successful under Philippine law, which has yet to catch up with today's level of computer crime.

PDA

Tim Bjarin looks at how the top-selling handhelds are poised to encroach into new territory

PDAs fit to burst their market

More than half of an audience of 1,000 IT managers I addressed recently said they used a Palm Pilot or Handspring Visor, confirming that these handhelds are gaining significant ground in business as well as consumer markets.

More than seven million Palm Pilots have been sold in the past four years, giving Palm 70 per cent of the market. The Palm-compatible Visor PDA has gained 25 per cent of the market nine months since its launch.

Devices using Windows CE (now called PocketPC), still languishing from the weak software and hardware designs of early models, have only about five per cent of the overall handheld market. Analysts believe that today's total sales of eight million handhelds are just a drop in the bucket when it comes to their long-term potential.

The concept of the Pilot-style organiser can be traced back to Apple's original Newton, introduced with much fanfare in the early 1990s. It became a big flop due to its poor handwriting recognition and Steve Jobs killed off the device shortly after he returned to Apple.

But in hindsight, Apple and John Sculley, its CEO at the time, started a revolution. The Palm Pilot is the brainchild of Jeff Hawkins,

who spent three years at Grid trying to perfect the first pen-based PCs in the early 1990s.

From this work he drew one important conclusion: users needed to be taught how to write on a touchscreen in a way that a computer could read. From this idea came Graffiti handwriting recognition and the Palm OS.

The other key decision was to avoid trying to make the Pilot all things to all people. Users got a fixed set of applications, such as a scheduler, address book, memo and to-do lists. In essence, Hawkins under-promised but over-delivered to the extent that thousands of applications from more than 5,000 developers are helping to extend the power of the humble Pilot.

Hawkins helped found Handspring, after the sale of Palm to 3Com (via US Robotics), and licensed Graffiti and the PalmOS for the Visor. He made one key

design change, the 66pin Springboard expansion slot.

This is to the handheld what the PCI slot was to the PC, allowing it to host a

and, most significantly, a cellular phone.

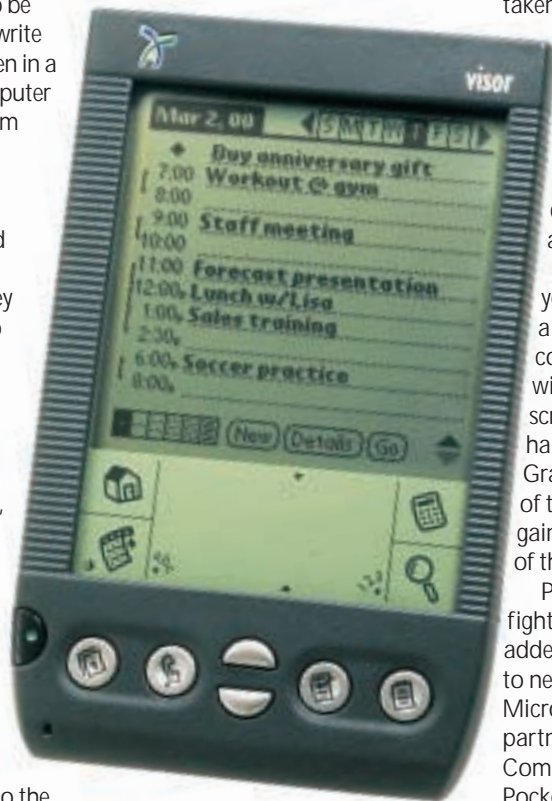
The idea of bringing Internet data to a cell phone via WAP protocols has not taken off in the US. This is because small screens are hard to read and a numeric keypad is not a good way to enter text. Consequently, phone-centric data devices will continue to struggle for acceptance in the US.

On the other hand, if you take a Visor and add a cellphone wireless connection, this PDA, with its relatively large screen, and its solid handwriting input with Graffiti, has the potential of taking off fast and gaining the lion's share of the mobile data market.

Palm and Microsoft are fighting back. Palm has added an SDRAM slot to newer Palm Pilots; Microsoft and its hardware partners have included Compact Flash slots on Pocket PC devices. However, the Springboard remains the more robust solution.

Handspring, at least for now, appears to have the leadership position and its approach will force competitors to be even more aggressive with their own add-on capabilities.

The Palm m100 is reviewed on page 100.



limitless variety of hardware add-ons.

Already, third-party vendors have created Springboard modules that can turn the Visor into a bar-code scanner, GPS receiver, pager, IR remote control or email access device. Modules in development include an MP3 player, digital camera –

Symbian preparing to pounce on WAP

The Visor is, of course, not the only handheld design to challenge the WAP phone. Symbian, the dark horse of the market, has been working on devices designed from the ground up for mobile communications for two years. The company, jointly owned by Ericsson, Matsushita, Motorola, Nokia and Psion, got a big boost last month when it licensed its Epoc OS to Sanyo. In May this

year, Sony said it would use the platform for its next-generation smart phones.

The backing of Sanyo and Sony will give it more visibility in Asian and US markets, according to IDC senior analyst Catherine Pennington. 'I think other companies will start to come on board now,' she said.

Symbian is coming late to the market: first devices are not expected to ship until mid-2001.



Speed is good but battery life is better, says Gordon Laing as he expounds the virtues of a new chip

Long live Crusoe



Hypocrite! That's what I've been called for banging on about the latest, fastest technology in one article, then asking why anyone would need it in another. Let's face it, almost every computer magazine cover screams

'World's fastest PC', while some editorial comment within begs the question who's it for apart from graphic artists, scientists and, of course, gangs of high-resolution gaming fanatics?

Personally I love quick PCs in the same way as a car enthusiast falls for fast motors. The technology is often fascinating, and what's wrong with an aspirational object of desire on the front of your favourite magazine? So saying, every technology has its place and while I enjoy using the fastest CPUs on Earth, this is all in the context of my desktop PC, where mains electricity is prevalent and nothing ever leaves the safety of my office.

Take me outside, pop me on a plane, train or

After all, I only got such a good deal on my WorkPad because somebody REALLY DID GET FIRED for buying IBM

automobile and the story changes. My portable of choice is not the latest mega-notebook with processing power to match my desktop, but the smallest device with a decent keyboard and, crucially, the longest possible battery life.

My current portable is an IBM WorkPad, an ill-fated larger form-factor Windows CE device that, while winning the hearts of the discontinued equipment bargain hunters in the PCW office, didn't fare so well selling at full price in the corporate US market. While the battery life of CE devices is relatively good, proper Windows notebooks are more appealing, especially to corporate IT managers who fear making the wrong purchasing decision – after all, I only got such a good deal on my WorkPad because somebody really did get fired for buying IBM.

You see, it's not just that current Windows notebooks go fast, but that you really can run the same software as you do on your PC. While the cut-down features of Windows CE are tolerable in exchange for longer battery life, its software is a lot more basic than you think, and I

certainly end up wasting time dreaming up elaborate workarounds for lack of hardware support.

The only problem is that whenever I use a notebook on the move, I'm lucky to get more than two hours out of it, and that's what's driven me to simpler devices. This is why, like the rest of the mobile industry, I'm very excited about the Transmeta Crusoe processors that tackle the problems of mobile environments from the ground up, as opposed to bolting new power-saving features onto what are essentially desktop CPUs.

Much has been written about the Crusoe's simple VLIW (Very Long Instruction Word) engine, which doesn't directly understand Intel's x86 instruction set. The reason x86 is so important in today's computing world is the wealth of software written for it. Crusoe gets around this by employing a 'code-morphing' software layer that takes the x86 instructions from proper Windows and its applications, then translates them into something the VLIW hardware can process. This eliminates the need for millions of transistors in the CPU, producing a smaller, faster and less power-hungry core. Transmeta claims this in turn increases battery life of devices significantly.

That's the theory, and we've yet to see how it fares in practice. Indeed, maybe fearing a serious threat in the low-power CPU market, a little mud-slinging has already occurred, with rumours that perhaps the code morphing software isn't 100 per cent Windows compatible. We'll just have to wait and see.

The good news is that several key portable manufacturers have taken on the Crusoe for future products. One that I'm particularly excited about is the likelihood of seeing a Crusoe beating in the heart of one of Sony's forthcoming Vaio sub-notebooks. When I first saw one of these tiny devices running full Windows a couple of years back, I was smitten. I was honestly about to hand my money over until I remembered it wouldn't match my Windows CE battery life.

By Christmas, this story may have changed. Sure, the Crusoe is unlikely to approach the speed of new mobile CPUs from Intel and AMD, but it's battery life that I'm after, and in that respect, Transmeta hopes to deliver in spades, while retaining full Windows compatibility. And you know what? That turns me on far more than the race to see who can deliver a 1,000MHz mobile CPU first.

gordonl@pcw.co.uk

In response to public demand, Barry Fox tells you why ASCII text is the only virus-safe form of email

Keeping it plain and simple



'Tell me more,' several readers asked after I welcomed the fact that virus scares are encouraging people to cut and paste plain text into emails, instead of sending binary attachments. No-one should assume they are safe from

infection. The European Broadcasting Union in Geneva was recently scourged by the Jokes virus. What is a binary; how do you cut and paste; is plain text really virus-proof; and why do line lengths end up all wrong? I've never yet seen a book or manual that explains these essential basics.

Viruses spring to life and copy themselves by email when an executable program file is run. Macros and active scripting, which add spice to a document, can hide a virus. So can a zipped file. 8bit words are needed to code these files. Although it is misuse of the word, they are often referred to as 'binaries'. Email programs attach them to a simple cover message.

Plain text, known as ASCII, uses seven bits and cannot code a program, or virus. But word processors, such as Word, automatically save documents in 8bit code to capture fancy fonts, formatting, macros and embedded pictures and sound. So they can hide a virus. To force plain-text saving, use the 'Save As' function and then select the 'Text Only' option.

Rich text format (rtf) is a halfway stage between fully formatted and plain text. It retains some basic commands that can make messages look more attractive. So can rtf hide a virus? No. But some viruses, such as Cap, wait until you try and save a Word document as an rtf, then silently intrude to save it as a virus-infected Word file, and sneakily stick the letters rtf at the end. Because Windows treats a Word file as a Word file, whatever the letters on the end, the virus springs to life when the file is opened.

Likewise, although plain ASCII is 100 per cent safe, if someone sends you an HTML web page written in plain text, and your PC uses an Internet browser to view it, this could release a virus such as Bubble Boy or Cak Worm. In Outlook, go to Tools, Options, Mail Format and set the send default to plain text, not HTML.

The easiest and safest way to send plain text is to Cut or Copy, and then Paste. While working in the word

processor, highlight selected passages of text or use Edit, Select All, and then Cut or Copy. This transfers the highlighted text to the Windows clipboard memory buffer. Put the cursor in the middle of a blank email message and Paste. The selected text is immediately transferred in safe plain text form.

Some fancy symbols, such as the Trademark icon, get garbled during the Copy and Paste operation. For months a supposedly high-tech PR agency was emailing out press releases which were riddled with gibberish characters instead of TM symbols. Go to Tools, Autoformat/Autocorrect and change the settings that control the way Word automatically changes plain text and quote marks into fancy characters.

Plain text can end up with each line terminated by an invisible but 'hard' carriage return. When someone tries to edit the text, the line lengths alter to keep the returns at the line ends. The result looks ragged and odd. Some word processors provide the option to import text by paragraph rather than by line, which strips out all single returns and leaves only doubles, as found at the end of a paragraph. This useful feature is seldom explained.

If you are confronted with return-ridden text, received either as an attachment or pasted email, and your word processor gives no easy option to clear them

Some viruses, such as Cap, wait until you try and save a Word document as rtf, then **SILENTLY INTRUDE to save it as a virus-infected Word file**

out, here's how to do it. Use Find and Replace, to find every carriage return and replace it with an unusual marker, such as a tilde. Then replace each double marker (which now signifies the end of a paragraph) with a single carriage return. Then replace every remaining marker with a space. The result is editable plain text.

This can be done either by the recipient or by the sender if the recipient complains. It can help, when writing the original, to leave an extra blank line between paragraphs.

The world would surely be a nicer place if these tricks were more widely known. But remember that people who send mail do not know how it looks on arrival, unless the recipient politely tells them.

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Getting unbiased guidance on an IT problem can be tough but there is a solution, says Brian Clegg

Independent advice



Dear Marge, I need some advice about my computer. Yours, baffled of Bognor. The cry goes up every day. Whether you're trying to decide which PC to buy or want to know how the Internet can benefit your business, advice is a precious

commodity in the fast-changing world of IT (or, as it is more trendily known, ICT – Information and Communication Technology).

Of course, magazines like *PCW* can help. You'd be foolish to venture into a shop without a trusty comparative review at your side. But often there's a need for more. Where do you turn if you can't find an appropriate magazine article? The traditional answer would be to ask the retailer for help. I tried ringing round a number of mobile phone shops, asking for advice on choosing a handset and network to connect my laptop to the Internet with an infra-red link.

I admit this was no scientific survey, but the advice

The Dark Lord's lair in deepest Reading has been running a **SMALL-BUSINESS TASKFORCE to encourage small companies to use ICT**

was very variable in quality. An accolade has to go to Carphone Warehouse, where I was given an exhaustive description of the options – but even they rather fell down by assuming I had more technical knowledge than a typical purchaser might have. At the other extreme were companies that offered me totally unsuitable phones or had no idea of the implications (present and future) of using different networks.

Apparently the retailer isn't an ideal source of information, as anyone who has tried to get technical advice from their friendly local superstore probably already knows. But, of course, in our eworld maybe I shouldn't have bothered talking to a human being at all. I plunged into the web – but didn't feel any happier. The trouble is, a query like mine that spans a number of technologies and vendors is particularly difficult to answer by cruising around websites. And my little example is, in a very simplified form, just the sort of problem that businesses face day after

day when trying to get a handle on ICT. A business doesn't want to know about the technology. It has a problem and wants it sorted using whatever is most appropriate.

Enter a white knight from a most unexpected direction – Microsoft UK. The Dark Lord's lair in deepest Reading has been running a small-business taskforce for a number of years. The idea is to encourage small companies to use ICT – and though we might suspect that this is not an entirely altruistic venture, it's attacking a real enough problem. If you look at the Federation of Small Businesses, which represents over 150,000 companies in the UK, around 70 per cent of their members don't use computers at all. This hardly puts UK Limited in the thrusting forefront of ebusiness. Often what's holding business back is a lack of knowledge about what's possible or how to turn an idea into technical reality. Not surprisingly, though, few businesses would trust a vendor like Microsoft to be impartial.

This need percolated up to the Government where, after much departmental agonising, a new three-way partnership emerged. In one corner of the triumvirate is the DTI, the second is occupied by corporate sponsors Microsoft, Compaq, Intel and BT (no prizes for guessing their collective interest in getting those 70 per cent switched on) and the third is the Institute of Management. The partnership has the stunning title 'Technology Means Business', but the idea is a lot better than the name.

Much as a good independent financial advisor should be able to guide you around the minefield of financial products finding the best ones for your needs, Technology Means Business is establishing a network of independent technology advisors who can give companies guidance on the best solutions for their ICT problems. The sponsoring vendors are kept at arm's length, providing resources but not influencing the advice, with the Institute of Management there to make sure the advisors remain truly independent.

It's early days for Technology Means Business, and it will never suit every client, but there's every hope that the day will soon disappear when one company has to rely for advice on someone that a company director succinctly described as 'a spotty kid who is an expert on video games, but knows nothing about business'.

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Nik Rawlinson changes his mind on the AltaVista fiasco in the light of its contribution to the industry

Villain turns martyr



Perhaps the most spectacular Internet failure of the year so far was not a failure at all.

Cast your mind back to March when you couldn't switch on the telly or radio without hearing another report that what we had all hoped was

close at hand had finally arrived – unmetered Internet access was finally with us, or at least it soon would be, courtesy of California-based portal AltaVista. Naturally, interest in AltaVista skyrocketed, and if you'd not heard of it before you certainly had by the end of the month.

Interest died down fairly quickly and things went quiet until late August when the company was back in the news in a far more prominent and spectacular way. Every channel and station, newspaper and IT magazine was carrying the same news – AltaVista was backtracking. There was to be no free Internet access. An indication of the impact the Internet has had on the general population is that the retraction was headlined on every news site, and when Andy Mitchell, the company's UK MD took the fall and resigned, it looked as though the media frenzy was about to go into overdrive.

My initial reaction was to assume that the original offer had been an empty one to attract users to its search engine, and so I boycotted the service, not that I use it much anyhow, preferring Google. But then I had a change of heart. AltaVista had surely already been punished enough, and perhaps something good had come out of it after all.

The afternoon of the announcement I received a call from ITN, asking me to appear that evening to present a short piece on the alternatives to the now defunct AltaVista offering – an appearance you'll be no doubt glad you missed. This set me thinking. Assuming totally free access is a definite no-no, for the time being at least, what else is on offer?

A hunt online very quickly brought up half a dozen similar offerings that would provide free calls 24-7 for between £50 a year and £10 a month. One of the £50 offerings even gave you the whole sum back as vouchers to spend with its online partners. Suddenly I realised what had happened – it was the Freeserve syndrome repeating itself.

When Dixons launched its subscription-free ISP a couple of years ago it was a matter of weeks before the

imitators were firing up their servers. While the likes of Screaming.net and IC24 staked their claim as free providers from the off, others, who had formerly charged for their services, rethought their business model in the struggle to stay alive, and soon everyone from LineOne to Virgin.net was discounting at 100 per cent.

As soon as AltaVista announced that it was taking things one step further, the same thing happened. A dozen companies immediately followed suit, offering unmetered access for a small charge.

Many of these succeeded but, sadly, AltaVista did not, and so the company that kicked it all off turned out to be the biggest loser. This cost it some credibility, some users and its UK top bod, who was no doubt showing his loyalty and trying to save the company some face. His statement on AltaVista's site placed the blame firmly at his own door, with a string of 'I have made mistakes...', 'I apologise to all who feel let down...' clichés.

In the more public forum of the mass media, the company was targeting BT, claiming that it was unable to deliver the circuits needed to run the service, and BT was valiantly fighting back with counter claims that there was not a telco in the world offering the pricing structure AltaVista had outlined.

Whoever was to blame, though, one good thing has

Many succeeded but, sadly, AltaVista did not, and so the company that **KICKED IT ALL OFF** turned out to be the biggest loser

come out of this – free Internet access. Yes, perhaps you do have to pay £50 a year for the cheapest offering that I found on that first quick scout, but that is surely a small price. Five years ago some operators were charging that for a month's service – and that was without the cost of your calls.

Mitchell may well be feeling pretty down as I write this, but he should not. His unfulfilled promises pushed the UK one step closer to the day when we will all be able to stay logged on for as long as we want without the constant thought of how much it is going to cost when the bill comes through. He is not the villain I initially thought him to be, but an online entrepreneur, turned martyr to the cause of unmetered access.

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letters

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THE PRICE OF TAILORING

I am a fairly experienced PC user looking to upgrade my increasingly obsolete Pentium 233 system. Having seen Mesh systems perform consistently well in your group tests each month I decided to investigate the possibility of buying an entry-level system from the company. I was attracted by its claims that its systems are built to order, meaning you can configure your own system via the company's website. The built-to-order claim suggested to me that I would incur no extra cost for using the service.

Having selected my desired spec – a 700MHz Athlon-based system, my only extravagance being a CD-RW – I was disappointed to find the quoted price was £1,321. Shocked by a steep price for what was a fairly basic PC with no printer or scanner, I investigated the

service further. I typed in the exact spec of the Matrix GeForce into the Custom Build area and my suspicions were confirmed by the £1,397 price tag – over £220 more expensive than the usual price, simply for the privilege of configuring it yourself! I could understand a small surcharge if there was an unusual demand, but £223 extra from a company that supposedly builds to order?

Another point of contention is that Mesh only offers a Slot A motherboard for the Athlon systems, thus removing the possibility of upgrades in the future without also changing the motherboard.

JAMES HAYES

MESH replies >

We are pleased that Mr Hayes was impressed by our performing consistently well in group tests. Mr Hayes mentions that he chose a 700MHz processor, but does not specify which other components he chose other than the CD-RW, it is therefore difficult to comment on the price of what Mr Hayes regards as a 'basic PC'.

As regards Mr Hayes' main point that a Matrix GeForce is cheaper to buy as a package than to configure online, I can confirm that he is correct. When you buy the GeForce you benefit from buying a package of components, which we can make cheaper because we are passing on economies of scale that are only possible because lots of our customers want to buy the same spec machine.

Online configuration is meant to benefit customers who want to buy something we don't offer as part of our standard range, but do have available. I think the best way to illustrate the difference between the two is to liken buying a GeForce to booking a package holiday: When you book a package holiday you benefit from the fact that yourself and several others want to fly, transfer and be accommodated at the same time for the same price. You could probably have the tour operator put together exactly the same itinerary on an individual basis, but would be unlikely to beat the package price.

SHOCKING EXPERIENCE

A couple of weeks ago I was working on my computer, when it suddenly died, along with my TV and video. After

restarting the TV and video, I tried the PC, but unfortunately it would not boot up. The next day I took the PC down to my local PC shop to have it checked out. The verdict was that the motherboard and hard drive had burnt out. When I asked what had caused this, I was told it would probably have been a power surge. The power surge that had knocked my TV, PC and video out the previous day had caused £392 worth of damage to my computer.

I wrote to my local electricity company, which carried out an internal investigation, to discover, it claims, that my property had not been affected by any supply interruption on that day.

In the letter I received from the electricity company, it argued 'like all other distribution companies, we are unable to provide a computer graded supply due to the sensitivity of such equipment'. It also suggested I buy an uninterruptible power supply (UPS). If the electricity company cannot supply a safe current of power for computers, why doesn't it state this on its bills? I am sure many people are unaware of the problems and costs a power surge can cause.

EDWARD BOSSON

GPU POWER UK replies >

After a thorough investigation into your claims, GPU Power UK can confirm that your property was not directly affected by any supply interruptions on that date. However, you may have experienced brief dips to your supply, as normal switching operations were carried out on the network. It is important to remember that these switching operations are a normal feature on all electricity networks and would not have resulted in any customers being supplied with abnormal voltages.

An abnormal voltage would have damaged all appliances connected to the electricity supply at that time, plus other customers in the area would also have experienced these effects. In these circumstances GPU does repair any damage caused.

All electrical equipment should be made to withstand small dips and momentary loss of supplies without damage, as this can and does affect all networks, although with computers it is mainly the loss of data if the power goes off that



can cause the greatest inconvenience. Anyone who wishes to avoid this can buy an uninterruptible power supply (UPS) which is a special device that operates between the equipment and the power supply acting as a filter to smooth out any voltage fluctuations and act as a backup if the power is suddenly lost.

WE PAY ENOUGH TAX!

I have to make comment on Nik Rawlinson's column in the October issue, entitled 'Don your Internet condom'. I agree that it's important to protect your PC from virus attack, but

disagree that it should be the user who is taxed for it. We already all pay a 'tax' on our PC in the form of the operating system. I'm not claiming that any OS is perfect, but Windows is particularly poor. One, it's popular and therefore a primary target for any attacker, and two, security is not an important consideration for Microsoft.

Microsoft may do a great deal of research and find that security is only nineteenth on the consumer wish list, but it really shouldn't be an option. The company already uses smart update technology to update security in Internet Explorer. If it had written a secure OS then that too could be updated in a similar fashion. The majority of users then wouldn't need anti-virus software. Perhaps, rather than offering companies £10,000 to cure virus attacks, the taskforce could fine OS manufacturers for every security loophole that is exploited, proportional to the likely number of machines affected. The financial disincentive might persuade Microsoft to take security seriously.

STEVEN J LILLEY

NIK RAWLINSON replies >

It's untrue to say that we all pay a tax on our PC in the form of an operating system. You are not obliged to buy Windows so if you don't want it

simply specify an alternative – many vendors are already supplying machines with BeOS or Linux and you could always go down the Mac route if you'd prefer. To believe that Microsoft does not take security seriously is also a mistake. One of the world's biggest users of Microsoft software is Microsoft itself. The whole of Windows 2000 was stored on a server running the Windows 2000 kernel and you surely don't feel the company would do that if the system wasn't 100 per cent secure? Your comments that Windows cannot be updated electronically are also patently wrong – there is, after all, Windows update running through microsoft.com. You state on your own website 'For some years now I have been strongly anti-Microsoft...' and I think that, sadly, where this company is concerned you are too keen to see the bad points in preference to the good.

CUSTOMER SERVICE GRIPE

In July, I bought a Pentium III system from Gateway costing £2,000, falling victim to a glossy spread in the latest edition of PCW. The machine was delivered a week later, unfortunately in unworkable condition. This was because Gateway had failed to configure the machine as ordered with an upgrade video card to enable the use of the EV700 LCD monitor.

I spent two hours on the phone suffering the indignities built into Gateway's telephone system, to be

LETTER OF THE MONTH

GREEDY OR JUST BARGAIN-HUNTING?

I was surprised to read Nik Rawlinson's response to Tom Swinney's letter in PCW/October 2000. Combined with the reply from breathe.com (to Robin Down's letter of the same issue), this highlights the inherent problems in charge-free Internet. If I, as a user, don't have to pay per minute then surely I am going to use the Internet for as long as I wish, as I am entitled to.

Isn't it a bit unfair to restrict users to only two hours' access a day? How would I have downloaded my new sound card drivers, at over 40MB with that restriction? To call users who use more than the two hours 'greedy' is absurd. When the service was advertised I very much doubt that customers were issued a time limit to connection times and suggesting that 'a lot of users have greedily 'rigged their PCs to automatically reconnect' is ridiculous. How many users, when using the net, reconnect after a disconnection so they may continue working? I would have serious doubts that those users set their PCs to reconnect and then have them sit there doing nothing.

Free Internet access providers are struggling because most did not predict the response of the public and very few can cope with the usage levels. Freeserve, one of the initial local call-only operators, managed to become one of the largest ISPs in the country in a matter of months, mainly through the public's nose for a bargain. Yet, even after services such as

Screaming.net had almost become crippled by the sheer weight of its users, newer free Internet services still seem surprised by the number of subscribers and few manage to keep up their level of service.

These services cannot cope under the sheer usage demands of customers expecting to be able to connect when they want and for as long as they want. In order for the providers to try and attract customers, prices are being dropped and business plans are tightened accordingly. The end result is less bandwidth per user and, in effect, a system that regularly has trouble coping with the number of users. Of course, these companies have to try and make money, but to sell the services in this way seems illogical – the subscription charges can only spread so far, and something has to give.

I am not surprised by breathe.com's response; naturally it is only going to selectively keep those customers who allow them to increase profit margins. And as long as it fully refunds those customers who are ejected from the scheme, then fair enough. I also doubt that LineOne's scheme is going to be the only one that is withdrawn. It looks as though AltaVista has taken the best way out by not even launching its service. As broadband allows more users to join the privileged few that enjoy always-on Internet, shouldn't almost always-on become available to those domestic users who do not? Is that really so greedy?

DARREN TANNER



Students have different needs and some will require more than just a basic PC

finally assured that a technician would visit. No surprise, really, when he didn't. I received no apology for this, nor did I get an explanation even though I spent a further hour on the phone asking why the promised technician had not appeared. So much for Gateway's mission statement, which promises 'to treat clients as we would like to be treated ourselves, giving them honest advice, great products and services'. Its so-called 'client relations' and 'technical support' departments seem to me to be entirely motivated by the idea that the customer doesn't matter once they have parted with money. I have still no certainty that I will ever get what has been paid for – a functioning machine.

MR FLEMING

GATEWAY replies >

Gateway is committed to ensuring that all of its customers receive the highest possible levels of service and support. In fact, the quality of Gateway's service and support is a major reason our customers keep coming back to us – we're proud to have one of the highest repurchase rates in the PC industry. We are therefore extremely sorry about the difficulties Mr Fleming has experienced with his PC. When our customers do experience problems we make every effort to resolve them as soon as possible. We have already replaced Mr Fleming's video card and, as a gesture of good will, have sent him a digital camera and a CD-RW drive to upgrade his PC.

STUDENTS DON'T NEED EXPENSIVE PCS - DO THEY?

A work colleague's daughter is due to start university in September and your article on student systems (PCW September) caught her attention. I read your article with interest as, not so long ago, I left university, completing my course successfully without the aid of my own computer. I found that the university provided an ample number of computers and my only expense was on floppies and laser cards to print any assignments. Over three years I must have spent in the region of £70 on both, which I thought wasn't bad.

I feel that for your magazine to recommend systems at the £1,000 mark places a burden on both students and their families as there are other options available. It would be great to see a review in your magazine of a system from one of the retailers that do not have a multi-million pound advertising budget.

I had to resort to the Internet in an effort to find what I thought would be an ideal system for someone starting university. The system I found cost £550 inc VAT (500MHz, 128MB of RAM, 17in monitor, 8GB hard drive and a modem) from RL Supplies, a brand I've never seen mentioned in your mag. The system came as promised from the supplier, was well built and, to be honest, surprised even me. It may not be built from Creative this and Sony that, but it does

the job just as well at a fraction of the cost. I feel the system will serve my friend's daughter well and cope with anything that will crop up over the next three years. We've loaded a cover disc version of Lotus 97 and she is in the process of getting student licences for both Photoshop and Illustrator. If she learns anything in three years it will be good system management. An 8GB hard drive may not be much, but she'll know where everything is and it'll teach her how to be organised with the space she has, something 20GB does not promote. This system will be just as out of date in three years' time as the ones you have recommended, and once she's finished university, if an upgrade is needed then a new motherboard and CPU will be all that is required.

It would be refreshing to see such an approach taken by you – how many of the £1,000 systems will be used for word processing alone? About 95 per cent I would say.

DOMINIC DOUGLAS

JALAL WERFALLI replies >

While we would agree with you that it is possible to shop around for cheaper PC packages, the reason we set ourselves a budget of £1,000 is twofold. First, we have had problems in the past with companies that cannot fulfil orders after they have been recommended in PCW. All being well, it is feasible for a small company to cope with building a small number of machines a week, but what are the consequences when they receive orders, overnight, for hundreds of PCs? This would put a strain on all their resources including after-sales support, and if a shortage of stock occurs then the company may go under – something we have seen happen all too often.

Second, most of us here at PCW have been through the university system, and know that there is a very wide cross-section of PC users out there. While some students are content with the facilities provided by the university, others fork out thousands on their new machines. So to encompass as many PC users as we could, we felt the £1,000 mark was more appropriate.

However, the system you describe sounds like a decent one for the money and should serve your friend's daughter well for the duration of her course, especially if either of you is willing to take on the upgrades. We wish her all the best in her studies and offer a few words of advice – those artistic files can be huge.

CLARIFICATION

The name of the Samsung monitor reviewed last month on page 96 should have been SM170MP not SM179MP as printed.

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Jason Jenkins
SENIOR STAFF WRITER

Cutting the umbilical cord

There's nothing more annoying than the Gordian knot of cables that hang out of my PC. My desk is a tangled mess of intertwining wires, all with different, strangely shaped connectors. If I could get rid of them in one go, I would.

That's why I am getting excited about the new wireless technologies that are starting to appear. One that has really caught my eye hails from mobile phone operator Orange. It is the only UK network offering a High Speed Circuit Switched Data (HSCSD) service. This will initially be through Nokia's card phone 2.0 – basically a PC Card with a phone inside. This is intended to give you

wires from my desk. To an extent, infrared does this already, but Bluetooth does not need line of sight, and more than two devices can talk to each other at once. In theory, you could even set up an ad hoc network of, say, five Bluetooth-enabled devices, which is especially useful if you are in a meeting and need to share information.

Another technology standard, and this is one that is actually here, is 802.11b. This wireless networking standard can deliver up to 11Mbps/sec, and remove the need for costly Cat5 cables to be installed in your building. It also gives you the opportunity to wander around the office while still connected.

Having said this, the pesky cable may

My desk is a tangled mess of intertwining wires with different, strangely shaped connectors

connection speeds of 28.8Kbits/sec: a huge improvement on the 9.6Kbits/sec that anyone who uses mobile remote access is used to. This is achieved by utilising two GSM slots, rather than the single one that is required for voice and 9.6Kbits/sec connections.

Orange is aiming the service at its business customers, so if you are used to checking your email, downloading and sending files and browsing on the move, it has the potential to be a real godsend. Not only that, but Orange reckons that it will be able to achieve speeds of 64Kbits/sec by Christmas – a bold statement, but should it come to fruition it would mean that you can browse the net at faster speeds using a mobile device than via a landline. To top that, once GPRS comes along, Orange will have devices that can automatically choose between HSCSD and GPRS depending on which is appropriate – GPRS, says Orange, will be better for WAP, while HSCSD is more appropriate for data.

Then there's Bluetooth. This short-range wireless networking standard has the potential to get rid of a load more

be here to stay for a while longer yet. Orange's HSCSD sounds great, but considering the difficulty I have at times obtaining a single GSM slot on Orange, I will be interested to see how often the company will be able to provide two. Bluetooth has been promised for two years now, yet the main companies behind it have been unable to deliver any finished products – we've all seen plenty of demonstrations, but the date for final products always seems to be tantalisingly close, but not yet. Even 802.11b has its limitations. Actual performance will vary dramatically according to the building it is set up in, and it is still relatively expensive.

I can't be too downbeat about wireless though. I feel a bit like a UFO devotee: despite evidence to the contrary, I still want to believe. The idea of wireless is such a compelling one that I can ignore all the reasons the new technologies might not be so great and concentrate on what it could do for me. Hopefully, one day, my dreams will be realised, and then we can finally say goodbye to cables once and for all.

ratings

- ★★★★★ EXCELLENT
- ★★★★☆ VERY GOOD
- ★★★☆☆ AVERAGE
- ★★☆☆☆ BELOW AVERAGE
- ★☆☆☆☆ POOR

Apple G4 Cube

Nothing can beat it for sheer elegance, but it has a few hidden budgetary extras to consider

At the launch of the G4 Cube, Apple supremo Steve Jobs said that he wanted the company 'to be at the intersection of technology and art'. It's tempting to say that the Cube is more like the intersection of technology and fashion, but either way it's a gorgeous piece of kit.

Apple has taken one of its existing G4 desktop tower systems, squashed the entire machine down into an 8in cube and wrapped it in a case of toughened, translucent, silvery perspex. In reality, it's bigger and heavier than you'd expect from looking at the picture, but that just makes it seem all the more like a serious piece of computer equipment.

Apple's design is seriously minimalist. All the ports and connectors – two USB, two FireWire, 56K modem, Ethernet, audio and video – have been tucked out of sight on the raised underbelly of the unit so that they don't mar its streamlined elegance. The only visible features are the cooling vent on the top of the Cube and the slot for the DVD-ROM drive. This is mounted vertically, so you drop a disc down into the slot, then when you want to eject, you press the Eject button on the keyboard and the disc pops up like a slice of toast.

The designers have even managed to do away with the traditional On/Off button. Instead, the Cube has a small motion-sensitive sensor situated on the top of the unit, towards the back. The sensor lies beneath the surface of the Cube and its position is indicated by a small logo etched into the plastic so that not even a bump mars the smooth contours of the unit. To turn it on, or reawaken it from Sleep mode, you just pass your hand over the sensor.

Adding to the utter trendiness of the ensemble are the specially designed Harman-Kardon speakers – two small translucent spheres that look like toys, but produce a pretty good sound. And, at long last, Apple has done away with the awful keyboard and mouse it has been using for the past couple of years and replaced them with new models that won't make you want to throw them out of the window after five minutes' use.

The new Pro keyboard isn't as solid as the old Apple extended keyboard, but it's a full-sized affair with a complete set of function keys and separate navigation and cursor keys. The new Apple optical mouse has caused a bit of a fuss, though. It doesn't have a button as such, but the entire translucent upper casing of the mouse acts like a button so you can press down on it anywhere in order to select items on screen. It's a bit of a gimmick, but it looks cool and it's better than its predecessor.

Once you've finished gaping at the sheer elegance of the Cube, the fact remains that it's a computer – and an expensive one at that. It needs to earn its keep, so the components on the inside also need to be up to scratch.

There's no denying that the Cube is a pretty powerful computer, although it does have one or two annoying weaknesses. Our review unit – priced at £1,249 ex VAT – was based on a 450MHz G4 processor, which is roughly comparable to a Pentium III in the 800-900MHz range. However, you'll need to use software, such as Photoshop, that has been optimised for the G4 architecture in order to get that level of performance. The 20GB hard disk should be adequate for most users, but the 64MB of RAM is rather miserly. Photoshop will certainly require more RAM than that, as will many games.

Apple also likes to make a big fuss about iMovie, the video-editing program that it bundles with the Cube. Version 2.0 of iMovie, which has just been released, is an excellent product. It's easy to use and now includes lots of additional effects,

such as playing video backwards or adding sepia tones to a movie. The ability to connect a DV camcorder to the Cube's FireWire ports means that you can do some really high-quality video editing with iMovie, but you won't get far with 64MB of RAM, and Apple ought to include 128MB as an absolute minimum. Hard-drive space may also become an issue, but this will depend on the length of the films you create.

There is a 500MHz version of the Cube available that has more RAM and a larger hard disk. This costs about £300 extra, though, so if the Cube is already stretching your budget to the limit it might be cheaper to buy the 450MHz version and add some extra RAM when you've got a bit more cash available.

It's also disappointing to see that Apple is still using the aging Rage 128 Pro graphics card. We'd have preferred to see a faster 3D card, such as ATI's own Radeon, so don't expect the Cube to be the fastest games machine around.

Like all Apple machines these days the Cube lacks a floppy disk drive, so you'll need to buy a third-party drive such as the Imation SuperDisk if you want to use floppy disks. The size of the Cube also means that it has no room for expansion slots, so any expansion will have to rely on the USB and FireWire ports.

You might be able to manage without a floppy disk, but you can't do without a monitor. As the Cube is sold by itself, you'll need to add the cost of a monitor to your calculations.

The Cube does have a standard VGA connector, so any standard computer monitor will connect to it. But a designer computer like this needs a designer monitor, so the obvious choice is to buy one of Apple's new flat-panel monitors. To be fair to Apple, its new 15in Studio display (pictured top right) is reasonably priced, and has a screen size comparable to that of a 17in CRT. It's just as stylish as the Cube as it comes in the same translucent plastic, and at £699 ex VAT, it's quite cheap in comparison to other flat-panel monitors.



The inside of the Cube, with two spare memory slots



The one worrying feature of Apple's monitors, though, is the use of a non-standard connector called the ADC (Apple Display Connector). This allows the Cube (or a G4 PowerMac) to provide the video signal, power supply and USB connectivity (for the monitor's built-in USB hub) to the monitor with a single cable. In one sense, it is a good idea as it cuts down on the number of cables, and is in keeping with the Cube's minimalist approach. However, this does limit your graphics options, as these monitors require a graphics card that has the ADC built into it. At the moment, ATI is the only company that produces ADC-compatible graphics cards, although 3dfx has said that it may do so in the future.

However, the Cube, like the iMac, is aimed at non-technical users who don't want to go near the insides of their computer. You can open up the Cube in order to add more RAM – marvelling at the construction of its interior as you do so – but it really isn't intended for mucking about inside. If you want a machine with lots of upgrade potential you should look at the multiprocessor PowerMacs instead.

The Cube has been criticised for being too expensive, and it's true that

you could buy a traditional desktop PC or Mac with a comparable specification for £200-£300 less. But the whole point of the Cube is that there's more to it than just its technical specifications. First and foremost it's a lifestyle accessory – it just happens to be a computer as well.

Apart from anything else, you're paying for the clever engineering that enabled Apple to produce such a compact system. As well as being small, it's also virtually silent as it uses a convection cooling system that eliminates the need for an internal fan. That sort of detail doesn't show up on any benchmarking test, but it's part of what you're paying for when you buy an Apple computer. The bottom line is that no other personal computer looks or feels anything like the G4 Cube. We don't know if it's art, but the Cube is certainly high fashion and it will appeal to anyone who has even a passing interest in technology or fashion. Anyone interested in both might just as well hand over their credit card right now.

The success of the iMac proves that there's a big market for stylish, easy-to-use computers. It isn't cheap and won't

sell in the same quantities as the iMac, but you can expect the Cube to go down a storm with media luvvies, loft-dwellers and City boys with too much money.

CLIFF JOSEPH

DETAILS

★★★★

PRICE £1,467 (£1,249 ex VAT)
monitor not included

CONTACT Apple 0800 783 4846

www.apple.com/uk

PROS Superb design; stylish; compact; virtually silent

CONS Expensive; uses tired Rage 128 Pro graphics card

OVERALL The Cube's technical specification could be a bit more generous, but its sheer style and attention to detail make it an utterly desirable piece of techno-kit

iMac DV Special Edition

Apple's amazingly easy-to-use computer has added iMovie 2.0 for digital video camera fans

Despite being pushed out of the limelight by the stunning G4 Cube (reviewed on page 66), the iMac is still at the core of Apple's consumer business. Three years ago this multicoloured all-in-one put the company back on the map, and turned the idea of surfing on the Internet from geek to chic. The recent MacWorld Expo in New York saw the launch of the latest iMac line-up, but how do the new systems compare to their fruit-flavoured forerunners?

The most obvious difference between old and new iMacs is the colours – Indigo, Ruby Red and Sage Green replace last year's candy theme. The systems are available in various configurations, with the iMac DV Special Edition sitting at the high end. This time, a new model in Snow – semi-transparent white to you and me – complements the classy looking Graphite version. Snow is certainly an acquired taste and we have to say we've yet to acquire it.

Whether you go for the black or white option, you get the same package inside: a 500MHz G3 processor with 512KB of backside cache, running on a 100MHz bus, backed by 128MB of PC100 SDRAM (upgradable to 1GB). While not quite on a par with the new G4 systems, the speed is more than adequate for most Mac applications, and software that isn't enhanced for the G4's AltiVec multimedia instructions will probably perform as well as on the more expensive desktop systems. At 30GB the hard disk is generous and the slot-loading four-speed DVD-ROM is stylish, but the iMac's 15in monitor will put paid to any professional DTP plans. The screen supports resolutions up to 1,024 x 768 in 24bit colour at 75Hz.

The new iMacs have been given a boost on the graphics front, and now sport the same Rage 128 Pro AGP 2x chipset as found on the G4. Sadly this is still quite old and cannot even begin to offer the kind of performance with 3D graphics that we expect from today's PCs. What's more, Apple has crippled the chip by only providing 8MB of non-upgradable VRAM. It came as no

surprise to find the system scoring just 21fps in our Quake III tests 1,024 x 768 with 16bit colour. That said, we did manage a playable 30.2 frames at 640 x 480 and the system's software DVD playback is very respectable.

Games aside, the iMac is primarily sold on its ease



of use and access to the Internet. Here we cannot fault it. Getting the machine up and running is a doddle and even new users can connect up the 56K modem, follow on-screen prompts and be on the net in 10-15 minutes. Both Internet Explorer and Netscape are provided, along with Outlook Express for email.

Other software supplied includes the competent AppleWorks 6 integrated office suite, and the much praised iMovie 2.0. This is where the DV bit comes in – you can connect a digital video camera to one of the machine's two FireWire ports and then record and edit digital video. Again, our tests with iMovie showed the package to be incredibly easy to operate and we managed some fairly professional results, complete with titles, zooms, looping and sound effects, in around 20

minutes. iMovie is definitely the highlight of the system and Apple even supplies a FireWire-to-mini-FireWire lead to get you started straight away. Interestingly, while the iMac comes with Mac OS 9, the iMovie interface gives a flavour of what's to come in the much-awaited Mac OS X.

Along with FireWire, twin USB ports and Ethernet provide other external expansion options, and there are two headphone sockets at the front – handy if more than one person is using the system simultaneously. A VGA output at the rear provides the option of video mirroring for presentations but, sadly, there's still no removable storage device.

As with all new Macs, the DV SE comes with Apple's new Pro keyboard and mouse set. Both are huge improvements on the originals, with the 'no button, no ball' optical mouse offering a better experience than the previous design. The keyboard adds decent cursor, sound control and disc eject keys but loses the Mac's unique power on button. There's also an internal connector for AirPort wireless network cards, and the iMac's

fabled air-cooling which gives it virtually silent operation.

As a complete personal computer the iMac is hard to fault, but the best thing about it is the same thing that's good on all Macs – a truly plug-and-play OS and well integrated applications. On the hardware side Apple needs to look very hard at today's PCs – a G4 iMac with an ATi Radeon for the graphics would be a real Special Edition.

CHRIS CAIN

DETAILS

★★★★

PRICE £1,199 (£1,020.43 ex VAT)

CONTACT Apple 0800 783 4846

www.apple.com/uk

PROS Amazingly easy to use; silent; iMovie 2.0

CONS Poor graphics performance; no removable storage

OVERALL A Special Edition that, sadly, isn't special enough. If you want an iMac, the cheaper DV and DV+ versions may offer more value

Systemax 1GHz Flip Chip

The Systemax Ultimate Entertainment P1000RV is strong on home entertainment

The Systemax Ultimate Entertainment P1000RV is built around an i815e chipset and features Intel's top of the line processor – the 0.18micron 1GHz Flip Chip. This, like other Coppermine processors, has 256KB of on-die Level 2 cache running at core clock speed. This system is not as fast as 1GHz Athlons we have seen, only managing an overall SYSmark score of 187.

Inside the large tower case, is an AOpen AX3S motherboard fitted with 256MB of PC133 SDRAM on a single DIMM. This leaves two slots spare. The AX3S also has four PCI slots, one AGP 4x slot and a CNR shared with the fifth PCI slot.

Occupying the uppermost 5.25in bay is a slot-loading 16-speed DVD-ROM drive from Pioneer. Below this is an Iomega ZipCD capable of a 32-speed read, eight-speed write and four-speed rewrite – useful for backing up files from the 30.7GB Maxtor UltraDMA100 hard drive or the DVD-ROM drive. A 30GB hard drive is a little stingy at this price, but it is at least a 7,200rpm model. For those wanting to watch TV on the PC, the Hauppauge WinTV-Go PCI card with built-in composite video out should appeal, while a PCI Conexant 56K modem covers net access. In this configuration, there are two 3.5in and two 5.25in bays free for extra components.

Audio-wise, Systemax hasn't cut any corners, fitting a retail version of Creative's SoundBlaster Live! Platinum card. This comes with the Live! Drive II that sits inside a 5.25in bay, providing a multitude of connections that should satisfy musicians and hi-fi enthusiasts. These include optical and RCA SPDIF in/out connectors ideal for DAT or MiniDisc recorders, MIDI in/out connectors, RCA auxiliary in jacks as well as sockets for headphones and a microphone. In fact, Systemax has used all the extras in the retail version of the Creative card, including the digital DIN connector that sits in the top backing plate and the Digital I/O card. The latter shares the same connectors as the Live! Drive II with

the exception of optical SPDIF and mic/headphone ports. It is also fitted to a backing plate but blocks one of the PCI slots. For top-quality audio playback the DVD drive's digital SPDIF output is



connected to the Platinum board. Topping all this off is Creative's DeskTop Theatre 5.1 DTT2500 Digital speaker package giving Dolby Digital multichannel sound through the decoder amplifier and five satellite speakers with subwoofer.

Ignoring the onboard graphics, the P1000RV uses an OEM version of ATI's Radeon without any extra outputs. This version uses a chip clocked at 166MHz with 64MB of 166MHz DDR memory, meaning that it effectively runs at 332MHz. It achieves a respectable 3,298 3DMarks, and 47.2fps in Quake III, both at 1,280 x 1,024 with 16bit colour. This is slower than the Radeon we reviewed in last month's group test, because that one was ATI's retail board with DDR memory and chip speed respectively running a full 34MHz and 17MHz faster. Nevertheless, the OEM version will handle today's games without a fuss.

Hooked up to the Radeon is a CTX PR960F monitor sporting a 19in Sony FD Trinitron tube. This flat-screen aperture-grille unit displays a uniform brightness and a vibrancy. Power regulation and colour purity are both commendable. Around the back the non-captive D-SUB is joined by BNC connectors, and one upstream and two downstream USB ports. A further two

downstream ports are located on the side of the unit for easy access. On the front, the four-button OSD is easy to use with only a few presses leading you through a well-structured menu system. A maximum flicker-free resolution of 1,600 x 1,200 at 85Hz is possible but we preferred 1,280 x 1,024 at 85Hz.

The wheel mouse is nondescript but the Logitech Internet keyboard has a positive key press and buttons for volume, play/pause, stop and skip along the top. A Microsoft Sidewinder force-feedback joystick and a mic are also thrown in.

Systemax has been generous with its software bundle, too, including Lotus SmartSuite Millennium, Aliens versus Predator, RollCage, plus Mixman Studio and Cubasis VST for editing music. Although this machine came to us with Windows 98 pre-installed, Systemax has informed us that it will ship with Windows ME.

This is not the swiftest 1GHz system we've seen, but it is packed full of extra features. If you are looking for a multimedia PC this will entertain.

JALAL WERFALLI

DETAILS

★★★★★

PRICE £2,348.83 (£1999.99 ex VAT)

CONTACT Simply 08707 297 366

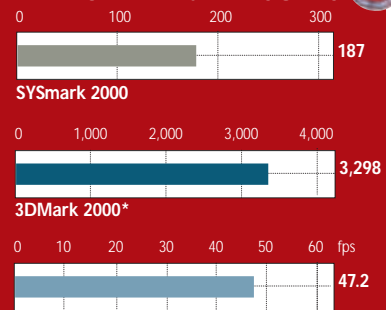
www.simply.co.uk

PROS Latest processor; good monitor; excellent sound capabilities

CONS Not the quickest 1GHz system

OVERALL A machine for those who have the cash and lean heavily towards the home entertainment market

PERFORMANCE RESULTS



* 3DMark 2000 and Quake III are tested at 1,280 x 1,024 16bit colour and textures

Mesh Matrix D750

A Duron-based budget system that boasts a quality motherboard and an eye on the future

This month's Duron offering comes from Mesh and sports the new 750MHz version of the budget processor. Budget or not, however, at 750MHz this machine hums along at a good pace.

As with many of the recent Mesh systems, the motherboard is an Asus A7V. This Socket A board employs the VIA KT133 chipset and it can only be described as a quality motherboard. With UltraDMA100 dealt with by a separate Promise controller, the potential for fast data transfer is there, although Mesh has opted for an UltraDMA66 hard drive, the Quantum Fireball Ict10, which has a spindle speed of 5,200rpm. As the D750 is a budget machine this helps keep the cost down, although the support for high bandwidth is worth bearing in mind if you plan to add a second drive at a later date – and considering the installed drive is only 20.4GB, respectably sized but not huge, this may be worth thinking about. This is also one of the few motherboards currently available with four EIDE connectors, two UltraDMA66 and two UltraDMA100. This means eight EIDE devices can be attached to the system, making this motherboard an upgrader's dream.

Memory comes in the form of a single 128MB stick of PC100 SDRAM. The board can support PC133 RAM, so some potential speed is lost due to the inclusion of the slower memory. There are two further DIMM slots for memory upgrade, giving a potential maximum of 1.1GB (or 1.5GB if the current stick is replaced by a larger module).

The K7V is also one of the few boards available with an AGP Pro slot. Although this is presently largely redundant, it keeps the system future proof. The concentration on future components is further reinforced by the lack of ISA slots, with five PCI slots and an AMR making up the motherboard's available internal slots. Of the PCI slots two are filled: one with the Diamond SupraExpress modem

and the other with the Creative Sound-Blaster Audio PCI 128 sound card, which pipes to the Powermax 80 speakers. This leaves three PCI slots and the AMR free for the addition of further hardware.

Another excellent feature of the Asus motherboard is the level of USB support it has. There are five ports: two are

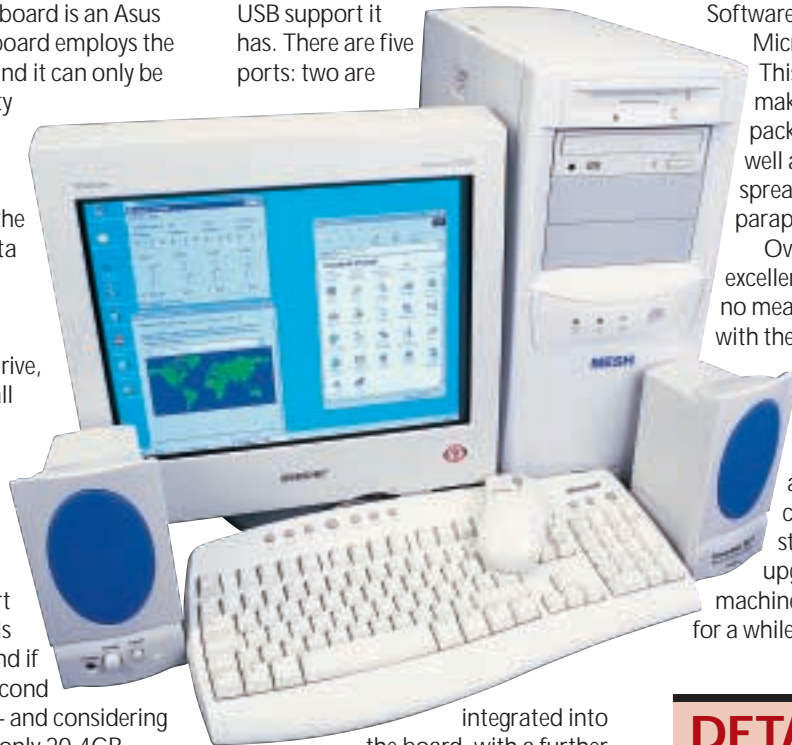
A Pioneer DVD-115 covers optical storage reading DVDs at 16-speed. There is no CD-RW included, and this is an area that you might want to upgrade in the future. Two 5.25in bays are free for upgrading, as well as one 3.5in for a second hard drive.

Software comes in the form of Microsoft Works Suite 2000.

This includes Word 2000, making this an adequate package for word processing as well as having the necessary spreadsheets and other paraphernalia most users require.

Overall the Matrix D750 is an excellent system for the price. It's by no means the fastest available, but with the superb Asus motherboard, there is plenty of scope for upgrading in the future. And the inclusion of the Sony monitor makes this a very good basic configuration as it currently stands. Although, with the upgrade possibilities, this machine can be the basis of your PC for a while to come.

SCOTT MONTGOMERY



integrated into the board, with a further three located on a backplate. The board also has a connector for a further two USB ports should they be required.

The graphics card installed is the Hercules 3D Prophet II MX, which is an excellent low-cost solution to quality graphics (*PCW* October page 92). With 32MB of SDRAM, this cut-down version of the GeForce2 GTS chip, in combination with the Duron processor, produced good results in both Quake III and in 3DMark. Running at 1,280 x 1,024 with 16bit colour and textures, the D750 managed a score of 2,922 in 3DMark and 42.6 frames per second in Quake III. This level of 3D acceleration is by no means the best on the market, but then taking the cost of this machine into the equation it is rather good. In terms of general performance a score of 131 was achieved in SYSmark 2000.

The 17in monitor is a Sony CPD-E200E FD Trinitron. This supports a maximum resolution of 1,280 x 1,024, and the image quality and colour representation is excellent – as we would expect from Sony.

DETAILS

★★★★★



PRICE £938.82 (£799 ex VAT)

CONTACT Mesh 020 8208 4706

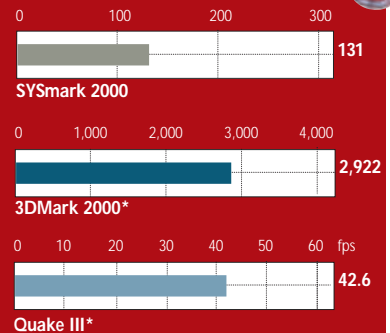
www.meshcomputers.co.uk

PROS An excellent motherboard makes this system suitable for future upgrade

CONS Hard drive could be faster; only PC100 memory

OVERALL At less than £1,000 this system is excellent both in terms of performance and value for money

PERFORMANCE RESULTS



* 3DMark 2000 and Quake III are tested at 1,280 x 1,024 16bit colour and textures

EXCLUSIVE

IBM NetVista X40

Looking stylish in its matt black finish, this well-designed PC is easy to use and will save desk space

It seems like space-saving and stylish PCs are all the rage these days, and it was only a matter of time before the original PC manufacturer got in on the act. Pushing aside the beige box appearance of standard PCs, the NetVista looks very stylish in a matt black finish that gives it a high-tech and expensive appearance. In fact it's one of the best-looking personal computers we've ever seen at PCW, with only Apple edging ahead in the design stakes. That said, unlike the iMac, which is aimed at consumers who want a good-looking computer in their home, the NetVista is aimed at the corporate user who wants something stylish and space-saving on their desk.

Beating at the heart of the NetVista is a 667MHz Intel Pentium III processor. This might not seem cutting edge compared to today's latest generation of 1GHz and above CPUs, but it's still more than adequate for the majority of duties that a machine like this is designed for. Backing up the CPU is 128MB of PC133 SDRAM and a 20.4GB UltraDMA66 hard disk. Considering the size of the machine this is a pretty decent spec overall. Performance is quite respectable with the NetVista turning in a SYSmark score of 130. You might not want to play the latest 3D games on it in high resolutions, but that's not really where IBM has aimed this box.

The integrated 15in digital flat panel is first rate and you'd be more than happy to work in front of the NetVista for an extended period of time. Even though the bezel surrounding the screen is fairly wide, it doesn't dwarf the screen, possibly due to it being black rather than the usual beige.

At first glance it looks like there are no drives fitted to the NetVista other than the internal hard disk, but this is not the case. Pressing the far left button below the screen results in a panel dropping down underneath the display. This panel contains both a floppy drive and a 24-speed CD-ROM drive. This

represents another great design feature since when these devices are not needed they're hidden and don't spoil the lines of the machine.

Connectivity is also well taken care of with the NetVista sporting an in-built 10/100 Ethernet adaptor and a V.90 modem in a PCI

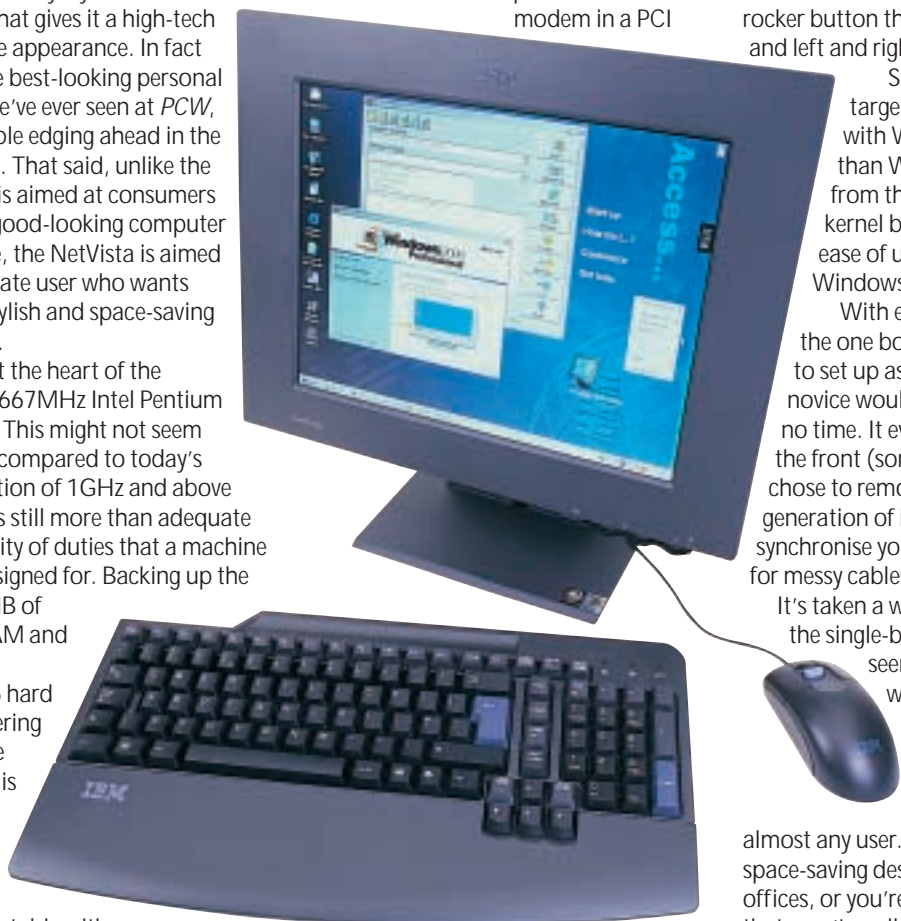
slot. Surprisingly for a machine of this type, there's still another PCI slot free for future upgrades, although you need to use low-profile PCI cards. You can also upgrade the memory since there's one empty DIMM slot inside.

The SiS graphics chipset has 16MB of video memory and supports Direct3D, so you could play the odd game if you wanted to. It doesn't, however, have an OpenGL API so you won't be able to play games based on this 3D standard such as Quake III.

There's an onboard sound chip that pumps its signal out to the integrated stereo speakers. Integrated speakers are usually tinny and empty sounding, but the speakers in the NetVista were surprisingly good. If you want better sound there is a line-out port to the right of the screen along with headphone and mic sockets. Below the sound ports you'll find two USB ports, while at the rear of the unit are another three USB connectors. Both the keyboard and mouse are USB and share the same black finish as the system itself. Instead of a scroll wheel the mouse sports a blue rocker button that moves up and down and left and right for scrolling.

Showing its corporate targeting the NetVista ships with Windows 2000 rather than Windows 98, so it gains from the robustness of an NT kernel but retains much of the ease of use associated with Windows 98. With everything contained in the one box, the NetVista is as easy to set up as an iMac, so even a novice would be up and running in no time. It even has an IrDA port at the front (something that Apple chose to remove from the second generation of iMacs) so you can synchronise your PDA without the need for messy cables. It's taken a while for IBM to produce the single-box solution PC, but it seems to have used that waiting period to produce a first-rate solution that looks great and has a solid enough specification to suit almost any user. If you're looking for a space-saving desktop solution for your offices, or you're after a stylish computer that won't spoil your living room decor, the IBM NetVista X40 won't disappoint.

RIYAD EMERAN



DETAILS

★★★★★

PRICE £1,522.80 (£1,296 ex VAT)

CONTACT IBM 0870 010 2512

www.pc.ibm.com/buydirect

PROS Stylish; well specified; easy to use and set up

CONS No OpenGL support

OVERALL A small, stylish and well-designed PC, proving that Apple doesn't have the patent on good-looking computing

PERFORMANCE RESULTS

0 100 200 300

130

SYSmark 2000

evesham.com Evolve

This PC has plenty of style as well as enough punch to keep the serious workaholic satisfied

There have been many attempts at building integrated desktop PCs with LCD monitors, but most have been under-powered and poorly featured, or have cost several limbs. evesham.com hopes to have overcome both shortcomings with the Evolve, an upstanding machine with more connectors than a strip of Velcro.

Dressed in two shades of grey, this Tatung-built machine looks neat and reasonably stylish. It combines several interesting innovations into a small-footprint system with a 15.1in LCD display panel.

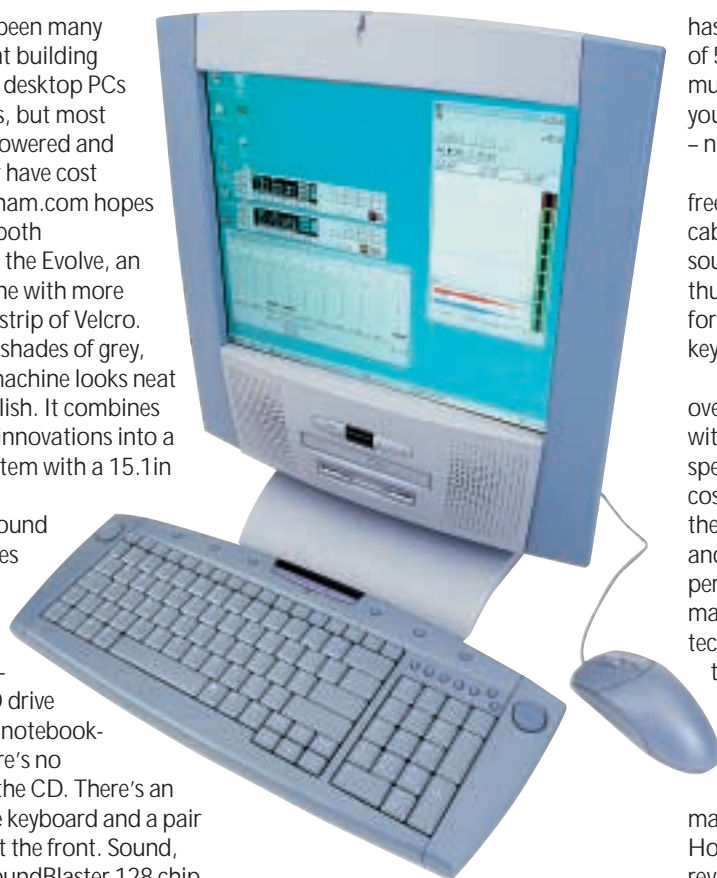
A quick look around front, back and sides will illustrate just what the Evolve has to offer. At the front are a four-speed Hitachi DVD drive and a floppy, both notebook-style devices so there's no motorised tray on the CD. There's an infra-red link to the keyboard and a pair of small speakers at the front. Sound, from an internal SoundBlaster 128 chip, is adequate rather than enjoyable.

Down the right-hand side of the machine is a serial port with mouse and keyboard sockets below. Then come a pair of PC Card slots – the only way of expanding the machine, as there are no internal PCI or ISA slots. Finally on this side are twin USB sockets and a 10/100BaseT Ethernet port.

At the back is a solitary parallel socket and a click-off cover providing access to the memory slots on the custom-made system board. The Evolve comes with a healthy 128MB, but can take 512MB.

On the left-hand side of the case is a second serial port, plus two more USBs, a composite TV output, a trio of sound jacks and twin jacks for phone line and phone handset. In the machine's stand is a final, heavyweight socket, which resembles a Centronics-style SCSI-port, but is in fact an expansion port that evesham.com doesn't use.

The 15.1in LCD panel is a fixed part of the system case, with the whole unit hinged to the base to offer variable screen tilt. The weight of PC and panel is rather too heavy for this hinge and touching the screen makes it sway.



The screen itself is clear and offers excellent contrast. Its 1,024 x 768 resolution is better reproduced than on a conventional monitor of this size and it uses an internal digital connection from the Savage 4 graphics chip – a better route than with most LCD displays, which include A/D converters to connect to the analog outputs of typical PC graphics adaptors.

evesham.com has specified a 700MHz Pentium III as the core of the Evolve. This is a conventional desktop processor, not the mobile version, and delivers a reasonable kick to the performance. It produced a SYSmark score of 134, which reasonable but it's a fair way below what we'd expect from a conventional PC with the same CPU.

3DMark refused to run on the machine, probably due to its paltry 8MB of video memory. The Quake III benchmark produced a fairly lame 8.3fps, too. This compares poorly with typical results from conventional desktop PCs.

A 20GB Samsung hard drive should provide plenty of room for most home and home-office applications and although it's an UltraDMA33 device and

has a comparatively slow spindle speed of 5,400rpm, you're unlikely to notice much impact on performance, unless you try using the machine as a web server – not what it's designed for.

The multimedia keyboard is a cable-free, infra-red unit, but is coupled to a cabled mouse. This isn't as illogical as it sounds, as the keyboard includes thumbpads at either end, so can be used for mouse control as well, if you have the keyboard on your lap.

Although you're paying maybe £500 over the odds for the Evolve, compared with a conventional desktop of the same specification, much of this is down to the cost of the LCD panel and extras such as the infra-red keyboard and the PC Card and Ethernet ports. Application performance is surprisingly good, for a machine built around notebook technology and, with the exception of the wobbly hinge, the only complaint we have is the Evolve's speed on games. If you have the money and want something unusual on your desktop, this cleverly designed machine fits the bill in nearly every way. However, the IBM NetVista X40 (see the review on page 79) has a broadly similar spec, and is cheaper too, so this might be a better option.

CHARLES MICHAEL

DETAILS

★ ★ ★

PRICE £1,996 (£1,699 ex VAT)

CONTACT evesham.com 0800 038 0800

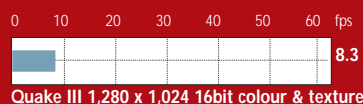
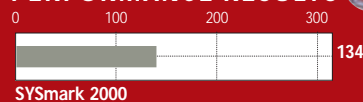
www.evesham.com

PROS Strong application performance; cableless keyboard; every socket and port you could want

CONS Poor 3D and games results; no internal expansion; wobbly hinge

OVERALL A better attempt than most to integrate an LCD panel into a desktop PC; good performance and a whole heap of sockets make it a fashion statement capable of hard work, too

PERFORMANCE RESULTS



Compaq Presario 5BW120

With lots of ports and quick-release components, you may want to upgrade this straight away

Compaq's Presario 5BW120 is the company's latest take on a computer for the home. If anything, it's a bit more conventional looking than recent models, which appeared to be based on early 1950s moon rockets. This PC looks more like a traditional rectangular box with a curvy fascia.

The near-white fascia is inset with a Smokey Quartz front, only hinting at the iMac obsession the rest of the industry has had for the past year or so. If the grey troubles you, the insert panels can be changed for any of five other colours with a MyStyle Accent Colour Kit. The lower part of the insert hinges down to reveal clips for up to four CDs or DVDs. It would be a good place to keep your Windows master.

Above the CD store is space for four drives, and this model has a Compaq DVD drive and a CD-RW from LG fitted in two of them, with a standard floppy in one of the two 3.5in bays below that. This combination of DVD and CD drives is almost ideal, enabling you to play and back up nearly all currently available formats. Two USB sockets at the front (there are two more in the normal place at the rear as well) give easy access to peripherals, such as cameras, that you only connect occasionally.

Inside, a 15GB Quantum Fireball Ict15 hard drive (13.9GB under Windows) provides permanent storage. All the drives are quick release, making maintenance of the machine very easy, and the hard drive sits just behind the front panel, leaving plenty of room for the micro ATX system board. Access to this is made particularly easy by a screw-less side panel.

A 600MHz Celeron is the powerhouse of the Presario 5BW120, although it only has 64MB of main memory. We found this a bit stingy even at this price point, and it would be the first thing you'd want to upgrade if you bought this, especially if you move to

Windows ME or 2000. There is only one available memory socket for expansion.

Although the Presario has just four

87, no great shakes for a 600MHz Celeron, and 3DMark indexes of 884 at 1,024 x 768 and 562 at 1,280 x 1,024.

These equate to game frame rates in the low teens or even lower.

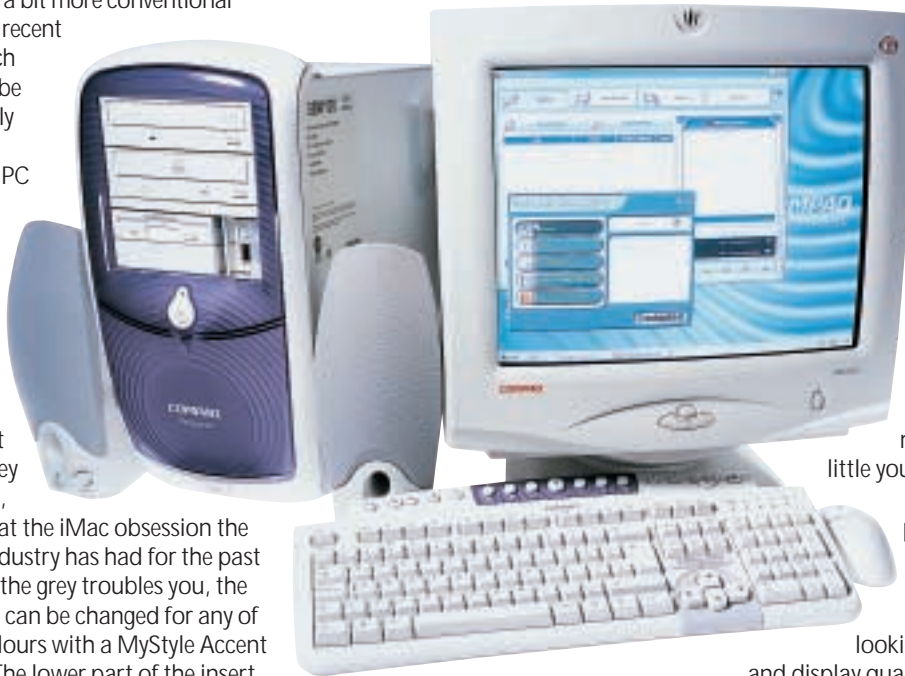
The company has extended its customised software bundle feature, which it now calls Select Yours. You get eight 'points' when you buy a 5BW120 and you can exchange these for software. This is a good way of bundling software as it should mean you end up with

little you don't use.

As an all-in-one package at a reasonable price, the Presario 5BW120 is a well-thought-out system, but

looking at its performance and display quality, it's nothing to write home about.

CHARLES MICHAEL



PCI slots, three of these are available, as a lot of the functionality comes from chips on the Intel motherboard. Sound is provided by a SoundBlaster-compatible chip and runs to a pair of reasonably substantial speakers that sit either side of the system unit. These give fair mid-frequencies, although the lack of a sub-bass unit limits the low-end response. The V.90 voice/fax modem is present and correct.

Graphics come from the Intel 810 chipset and are adequate at best. It drives Compaq's own 17in MV720 monitor, which is nothing outstanding, either. Though the combination gives a reasonably clean picture, the tube face is quite curved and suffers from below-average focus. Icon text on the Windows desktop is a little fuzzy, but should be OK unless you're using the monitor all day, every day.

Compaq's keyboard has a good feel and is comfortable to type on. The function keys in the top row are half-depth, leaving room for a row of dedicated multimedia and Internet keys. Compaq is heavily into the Internet on this system, but offers little that similar rival systems don't include.

Test results showed the Presario to be nothing special on performance. SYSmark produced an overall score of

DETAILS



PRICE £899 (£765 ex VAT)

CONTACT Compaq 0845 270 4000

www.compaq.co.uk

PROS Twin DVD/CD-RW drives; flexible software bundle

CONS 810 graphics and below par monitor; unexciting performance

OVERALL Compaq knows how to present kit to its target audience, but compared to other machines in the same price range, you can get a better picture and performance elsewhere

PERFORMANCE RESULTS



* 3DMark 2000 and Quake III are tested at 1,280 x 1,024 16bit colour and textures

Apple dual-processor G4

A Power Mac with two 500MHz chips offers blistering performance for image and video editors

In the ongoing contest between Apple and Intel platform manufacturers to produce the fastest, most powerful desktop machines, Apple has been losing ground lately, if only perceptually. Despite the absurdity of comparing performance of the PowerPC Risc chip with Intel's Cisc Pentiums, Apple's difficulty in pushing its CPUs beyond 500MHz is becoming a serious image problem when the competition is forging onward through the 1GHz barrier.

Apple's answer is the dual-processor G4 Power Mac. The hardware spec is awe-inspiring. With a peak performance of over seven gigaflops you expect it to emit clouds of dry ice from the cooling vents when you power up.

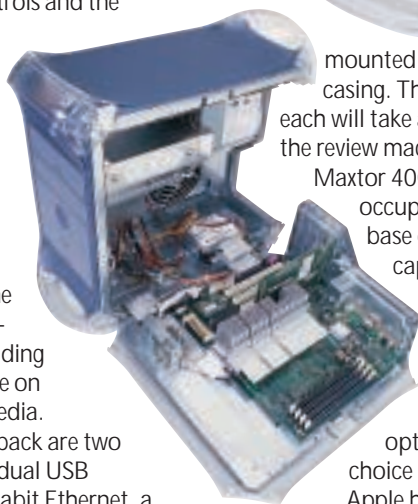
While the design follows the existing graphite G4 style, this G4 offers a few visual clues to its pedigree. First there's the Apple Pro keyboard with audio and media eject controls and the optical Apple Pro mouse

with full-surface clear plastic button. Pressing the media eject button on the front of the casing reveals the Panasonic DVD-RAM drive providing 9.4GB of storage on double-sided media.

Around the back are two FireWire ports, dual USB connectors, Gigabit Ethernet, a 56K modem and sound connectors. There are three 64bit PCI slots and a 2x AGP slot, home to the ATi Rage128 Pro graphics adaptor. As well as the standard VGA connector, the ATi card also features Apple's digital ADC (Apple Display Connector) port.

Getting inside the G4 is a simple matter of pulling on the quick-release latch and lowering the hinged side panel. Everything is within easy reach making installation of additional memory and cards a two-minute job.

The two 500MHz chips sit underneath a heatsink of architectural proportions with the vanes extending like a miniature high-rise development to dissipate the heat extracted by a large fan



mounted on the opposite side of the casing. There are three DIMM slots: each will take a 512MB stick of RAM – the review machine had 256MB. The Maxtor 40GB EIDE hard drive occupies one of three bays at the base of the machine each capable of taking two drives, so there's plenty of scope for storage. The review machine had a vacant bay beneath the DVD, this can be fitted with an optional Zip drive or your own choice of removable media.

Apple has been accused of smoke and mirrors sleight of hand by offering a dual-processor machine without the software to take advantage of it. MacOS 9 is blissfully unaware of the second processor's existence and this will be the case until the release of MacOS X next year. Only a handful of applications can take advantage of the dual-processor setup, among them Photoshop, Premiere, After Effects, Final Cut Pro, LightWave and Media Cleaner Pro.

That said, intensive processing of still images and video post-production are crying out for this kind of muscle. Apple claims that the combined processing power of the 500MHz G4s each with 1MB of backside Level 2 cache, boosted by the 'Velocity Engine' processing unit,

is on average around 40 per cent faster than a 400MHz G4 and an equal match for a dual-866MHz PIII.

Our Photoshop tests backed this up. Depending on the task, the dual-processor G4 outperformed a 450MHz G4 by up to a factor of two. Unsharp masking a 50MB image took less than two seconds compared with four seconds on the single-processor Mac. Radial blur on the same file took one minute 24 seconds compared with two minutes 57 seconds and a 90-degree rotation took less than a second compared with two seconds on the slower machine. Not all procedures showed such a marked performance increase – CMYK to RGB conversion times were almost identical.

Software includes Apple's DVD player and iMovie 2.0. DVD playback – aided by the Rage Pro card – was good, but not flawless, with playback pauses and temporary sound sync problems when accessing menus. iMovie 2.0 boasts better features than its predecessor, but is still a basic home video editor. If you need serious hardware you should budget for a copy of Final Cut Pro or Premiere.

The dual-processor G4 is more than a match in performance terms for single and dual-configuration Pentium PCs and beats them hands down for style. Despite gripes about software support it delivers the goods for demanding users in the image and video-editing industries all in one box. It offers blistering processor performance, high-speed networking, capacious storage, industry standard digital video connectivity, room for expansion and stunning looks. And, for once, Apple has adopted a reasonable pricing policy on its top-of-the-range machines.

KEN MCMAHON

DETAILS

★★★★★

PRICE £2,936 (£2,499 ex VAT)

CONTACT Apple 0800 783 4846

www.apple.com/uk

PROS Fast processing; fast networking; beautifully designed

CONS Current lack of multiprocessor support at system level and limited choice of applications with MP support

OVERALL Fast and gorgeous object of desire for those with demanding image-processing requirements and, for once, moderately priced



Silicon Graphics 230

Superb graphics on a high-performance Linux workstation, now at an affordable price

It's only in the past couple of years that the PC has been taken seriously as a professional 3D modelling and animation tool. Even now, the serious work is more likely to be done on a DEC, Sun, or Silicon Graphics workstation than a Wintel PC. But all that looks set to change with the introduction of three new machines from Silicon Graphics that are based on Intel processors and running Windows and Linux operating systems.

Silicon Graphics, probably best known for its involvement in digital special effects and animation for movies like *Toy Story* and *Chicken Run*, is renowned for its high-performance graphics workstations. With an entry-level system price of £1,890, the 230, however, is a moderately priced workstation aimed at creative and technical professionals in the CAD, government, medical and scientific research markets.

Looks have always been an important factor with SGI workstations, though these days the moulded blue and graphite casing with matching 19in monitor and keyboard is less of a novelty.

Our 230 review machine housed a single Intel 733MHz PIII, 256MB of PC133 SDRAM occupying one of the three available slots, a 9GB, 7,200rpm SCSI hard disk and a 48-speed IDE CD-ROM. The 330 and 550 variants are based on dual and single configurations of the PIII and PIII Xeon chips.

All this is compactly stored, leaving a great deal of space for additional drives and cards – there are three spare PCI slots, the Adaptec 3950 SCSI card and sound card occupying two of the available five. Despite the presence of four fans, including a massive rear extractor, the machine emits little more than a pleasant hum.

At the heart of the system is SGI's Vpro graphics subsystem, developed in

partnership with nVidia. The AGP 4x card carries 64MB of DDR memory and provides full hardware acceleration of the OpenGL feature set on a single chip. OpenGL graphics functions like transform, lighting, texture mapping and anti-aliasing are carried out by the chip, lightening the load on the CPU and providing a big graphics

their graphics applications to Linux. By providing hardware-accelerated OpenGL graphics on a high-performance Linux workstation, SGI hopes to start the ball rolling.

In terms of performance SGI quotes geometry processing speeds of more than 17 million triangles per second and up to 540 megapixels per second from the Vpro graphics subsystem. That won't mean much to most people, but the nVidia 3D demos provide a taste of the machine's capabilities, running a flight simulator and a variety of other 3D walk-through and fly-by routines with complex polygon modelling and scenery.

There are really only two choices for those wanting the kind of graphics performance the 230 offers. You can up the ante and go for a dedicated high-end workstation like the SGI Onyx II, but it has a price tag to

match its performance. More affordable would be to build a similar system by fitting out a PC with one of the many professional OpenGL accelerator cards now appearing on the market.

But you'd have to ask 'why bother?'. When for less than £2,000 you can have an integrated 3D development platform from the developer of the OpenGL API with a graphics subsystem from one of, if not the leading manufacturer of high-performance graphics cards.

KEN MCMAHON



performance boost. OpenGL on a chip is common to all SGI's Vpro products including the new Octane2 workstation.

The 230 offers a choice of operating systems: you can have either Windows NT4 or Red Hat Linux 6.1. The review model came with Linux pre-installed, but you can also opt for a clean machine and do your own installation.

Intel-based hardware is a relatively new area for SGI, which in the past has used only Risc processors produced by its MIPS subsidiary in workstations running its Irix operating system. A little more than two years ago the company realised that its survival was dependent on a broader approach that accommodated both Intel and Windows and the 230 is the culmination of that process.

SGI is banking on the machine appealing to developers in Windows and Linux environments. Because of the lack of a 3D graphics API and OpenGL driver support, there hasn't exactly been a stampede of developers rushing to port

DETAILS

★★★★★



PRICE £1,890 (£1,608.51 ex VAT)

CONTACT SGI 0118 925 7815

www.sgi.co.uk

PROS Great performance; ease of use; low price

CONS Coping with the envy of others

OVERALL There was a time when SGI machines were, for most of us, an expensive out-of-reach dream, now they're in the mainstream

Hi-Grade UltiNote

The AS8400-850 is the fastest notebook yet, but it's more wallet-breaking than ground breaking

Intel's march towards a 1GHz mobile processor continues this month with its latest release, a mobile Pentium III clocked at 850MHz. As always, when running on battery power the chip runs at a lower voltage and speed (this version steps down to 500MHz), which helps to extend battery life.

Hi-Grade seems to have a conveyor belt straight out of Intel's development lab, as once again it has provided us with our first look at this new processor. There's no denying that it is a speedy performer – its huge SYSmark 2000 score of 162 is the fastest we've seen for a notebook. There's a lot more to a good notebook than performance, though, and here Hi-Grade pushes nearly all the right buttons, but not quite all.

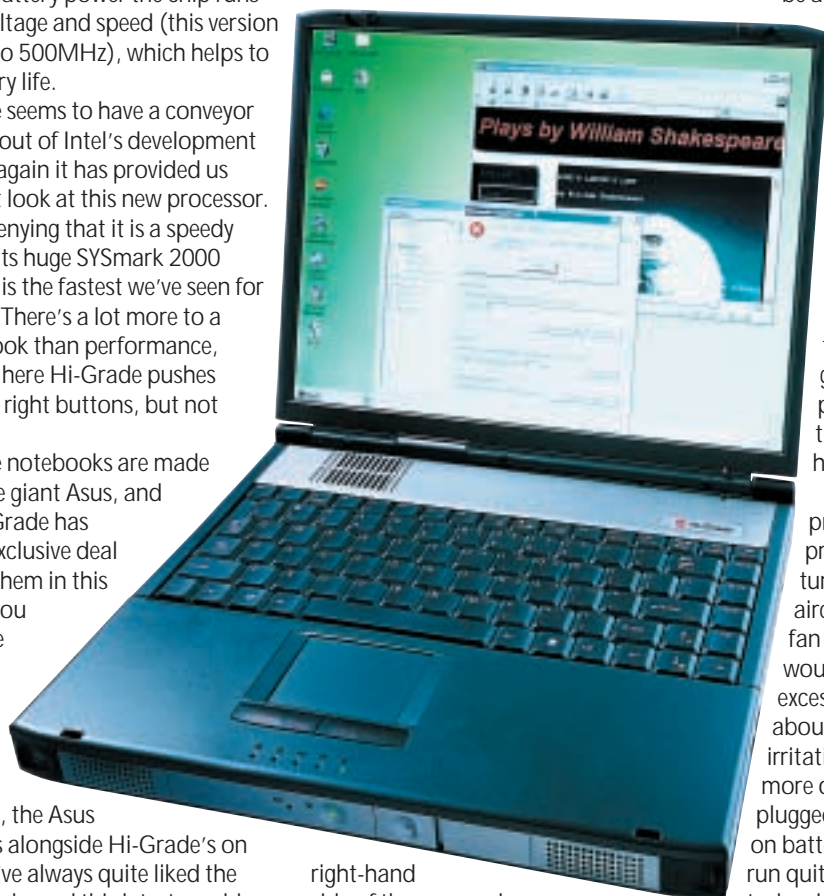
Hi-Grade notebooks are made by Taiwanese giant Asus, and recently Hi-Grade has secured an exclusive deal on reselling them in this country, so you won't see the UltiNote appearing under another brand. For the first time, the Asus logo appears alongside Hi-Grade's on the unit. We've always quite liked the Asus notebooks and this latest machine addresses some of the small number of issues we've had with them in the past.

One thing that we have criticised was the keyboard, and this is certainly better than previous efforts on the AS8400. The keys are still fairly thin, which is slightly irritating, but the base is now rock solid, with none of the flimsy feel of previous models. The keyboard is very comfortable to type on and is in good proportion to the rest of the unit, with enough space to rest your hands.

One thing we still don't like is the small return key, especially as Asus has positioned the page up and page down keys next to it, making it easy to hit them accidentally. Control of the mouse is through the touchpad, and there are two selector buttons below this.

Helping the overall performance of the machine is a huge 192MB of SDRAM, which means that you should have absolutely no problem keeping several programs running in the

background at the same time. Despite its relatively small size, Asus has squeezed in both a DVD, Toshiba's SD-C2402, and a floppy drive. Both of these sit at the



right-hand side of the case and are easily accessible. There is a volume control next to the DVD drive, so it's easy to adjust the speaker and headphone volume by simply turning the wheel.

Graphics are provided by an 8MB version of S3's mobile chipset, and this supports a secondary external monitor through the D-SUB port at the rear as you would expect. The 14.1in TFT screen has a native resolution of 1,024 x 768 and is a good example of a display in its class. This month, we have seen notebooks that have 1,400 x 1,050 native resolution panels, but these are the slightly larger 15in variety. Given the UltiNote's size, its resolution will be adequate for most people. An Aureal Vortex chip, the AU8810, provides sound and this has been set up to take full advantage of the latest A3D optimisations.

The left-hand side of the machine has two Type II or one Type III PC Card, plus an IrDA port. At the rear, there are two

USB ports, a single PS/2 for either a mouse or a keyboard, an S-Video out port, parallel and serial and a docking port. The S-Video port means that you'll be able to watch DVDs on your television with the copy of Power DVD that is provided.

Externally, it looks as though Asus has only included a modem port, but to this you connect a cable splitter to give you both Ethernet and a V.90 modem. This is fine as far as it goes, but we would prefer to see two dedicated ports integrated into the unit as the cable adds to the clutter and is more likely to get lost if you are the mobile professional Hi-Grade is aiming this product at. There is a 20GB hard drive inside for your files.

The only real problem with this product stems from its ultra-fast processor. When the cooling fan turns on, it sounds like a light aircraft taking off. Thankfully the fan is not on all the time, as this would drain battery power excessively, but when it is you know about it. We found this increasingly irritating as time wore on. The noise is more of an issue when the notebook is plugged in because when the machine is on battery power the processor does not run quite as hot thanks to the SpeedStep technology. This, combined with the fact that you don't get much more in the way of extra features, robs it of a star.

JASON JENKINS

DETAILS

★★★★

PRICE £2,442.83 (£2,079 ex VAT)

CONTACT Hi-Grade 020 8532 6100

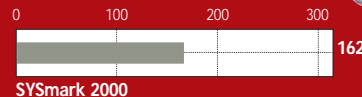
www.higrade.com

PROS Fastest notebook ever; lots of memory; good all-rounder

CONS Noisy fan; could do with a larger screen at this price

OVERALL A good all-rounder and definitely worth a look, but the same model with a slower processor would be just as good and a lot cheaper

PERFORMANCE RESULTS



SYSmark 2000

HP Pavilion PowerNow!

HP's N3370 is one of the first to utilise AMD's intelligent PowerNow! mobile processor

Intel processors dominate the notebook market, but this is about to change as rival processors from AMD and Transmeta start appearing in products over the coming months. This HP notebook is one of the first to use the technology that will underpin AMD's approach to the problem of power consumption in its next generation of processors: PowerNow!

The difference between this and Intel's SpeedStep technology is simple. Intel has designed its mobile processors to run at two different voltages, and therefore speeds, depending on whether the notebook is plugged in or not. AMD's PowerNow! technology does a similar thing, but at multiple power levels – the exact number is set by the notebook manufacturer.

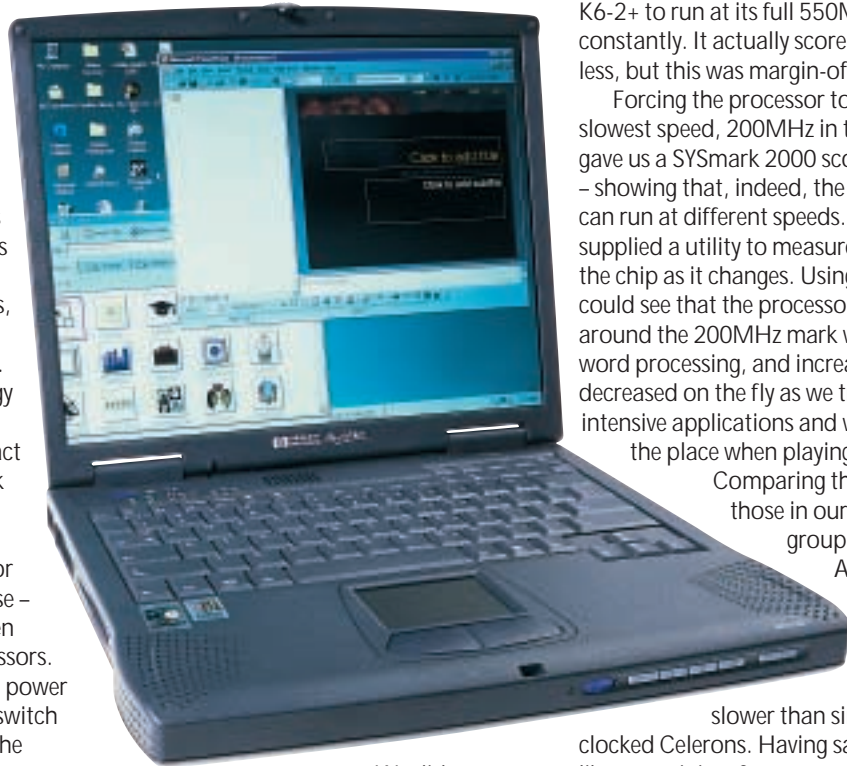
In its lowest power mode, AMD claims that the processor will consume 3w in 'typical' use – lower than products we've seen based on Intel's mobile processors. Not only does it have multiple power states, unlike Intel, but it can switch constantly between them on the fly, depending on the operation being performed.

If you are word processing, the frequency and voltage will be reduced so that the processor is running at, for example, 200MHz. If you are using a more intensive application, such as a software DVD player, the frequency and voltage will be increased.

The intention is that the user will not notice any difference – the notebook should simply be able to cope with anything you throw at it. The benefits are twofold. First, the fact that the processor is not constantly running at full speed means that battery life is increased. If the notebook is plugged into the mains, this won't be such a huge issue, but there is a secondary benefit. When the processor is running slower, it doesn't produce as much heat, making the unit a lot easier to use all round.

AMD will be introducing PowerNow! on all future mobile releases. At the moment, though, it only produces processors for the budget end of the market, but expect this to change

towards the end of the year as mobile Athlons and Durons appear. There's a shortage of UK products based on this technology at the moment, although this will change, as major OEMs announce that they have products on the way.



We didn't want to wait that long to test the new technology, though, so we managed to get our hands on a product available in the US. HP has a Pavilion range of notebooks available in the US, and its N3370 has the fastest mobile AMD processor currently available, a K6-2+ clocked at 550MHz. This features 32KB of Level one cache, 128KB of on-die Level 2 cache, 3D Now! Instructions and, of course, the new PowerNow! technology. The Super 7 architecture it employs supports a 100MHz front-side bus, PC100 SDRAM and AGP 2x graphics, and this notebook contains parts that put these features to good use.

A quick rundown of the spec shows 64MB of PC100 SDRAM, an 8MB Trident Cyberblade I7 graphics chip, a 6GB hard drive and a six-speed DVD-ROM. The 14.1in TFT is fairly good, as is the keyboard. Single USB, serial, parallel, D-SUB and PS/2 ports are present, plus a V.90 modem and one Type III/two Type II PC Card slots. Controls for the DVD drive are at the front of the unit.

The notebook threw up an interesting set of performance results. The Pavilion scored 63 in our SYSmark 2000 test. Thinking this was a little slow for a processor of this speed, we changed the settings in the power management applet in the control panel, forcing the K6-2+ to run at its full 550MHz constantly. It actually scored one point less, but this was margin-of-error stuff.

Forcing the processor to run at its slowest speed, 200MHz in this instance, gave us a SYSmark 2000 score of just 30 – showing that, indeed, the processor can run at different speeds. AMD supplied a utility to measure the speed of the chip as it changes. Using this, we could see that the processor stayed around the 200MHz mark when we were word processing, and increased and decreased on the fly as we tried more intensive applications and was all over the place when playing a DVD.

Comparing these results to those in our notebook group test in the April issue, it looks as though the K6-2+ processor is

slower than similarly clocked Celerons. Having said that, we'd like to see it in a few more units before reaching any final conclusions.

As for the HP notebook itself, it looks to be a very good product. It is only on sale in the US, but at a very low price. This range will launch in the UK next year and we can only hope that HP sees fit to sell the models at the same low price.

JASON JENKINS

DETAILS

PRICE \$1,999 (not available in the UK)

CONTACT HP www.hp.com

PROS The first product to showcase PowerNow!: good feature set for the price

CONS You can't buy it in the UK

OVERALL It looks as though AMD is hot on the heels of Intel once again – we look forward to seeing PowerNow! in a new generation of UK products

PERFORMANCE RESULTS



SYSmark 2000

IBM Thinkpad A20P

A redesigned rugged notebook has all the style, power and versatility you could ask for

IBM has recently refreshed its line of Thinkpads. The A20P is the top of the range from its desktop replacement line and it certainly is a very well-built machine. It does not come cheap, but you certainly get what you pay for.

The first thing you notice about this product is the outstanding build quality. The Thinkpad design is very distinctive, and is one of those that you either like or hate, but even if you can't stand the look, you can't argue with the fact that it feels very robust – the tank-like case should see the unit through a few knocks.

The second thing that jumps out is the large screen. It's a 15in TFT, with a native resolution of 1,400 x 1,050. This looks excellent – very bright and clear, with no flexing evident when the lid is moved. It looks best if you run the screen at the resolution it was intended for, but even dropping it back down to 1,024 x 768 did not affect the picture quality as much as it does on most TFT screens. At this setting, text is still very readable, although the image does look slightly blurred.

However, it is still more than usable.

The keyboard is, as always, also fantastic. The near-full size keys are chunky, like those on a standard keyboard, and feel solid to type on. IBM has also opted for a full-size Return key, which we like a lot. Our one gripe is that there is no Windows Start key, and this means that every time you want to select a program from the Start menu, you are forced to move the pointer all the way to the bottom left of the screen, which can be quite annoying.

The famous trackpoint makes an appearance again here and this is another of those IBM inventions that appeals to some but not others. Ideally, we would prefer IBM to include both a touchpad and a trackpoint to appeal to everyone, but this method does help to keep the size of the unit down. As with the I series notebook reviewed in the last issue (page 87), there is an extra button below the standard two selector buttons that, when pressed, allows you to scroll the open window by moving the trackpoint up and down. A Thinkpad key takes you straight to a well-written help program and there are volume and mute

controls next to this. There's even a tiny reading light, activated via the keyboard integrated into the screen.

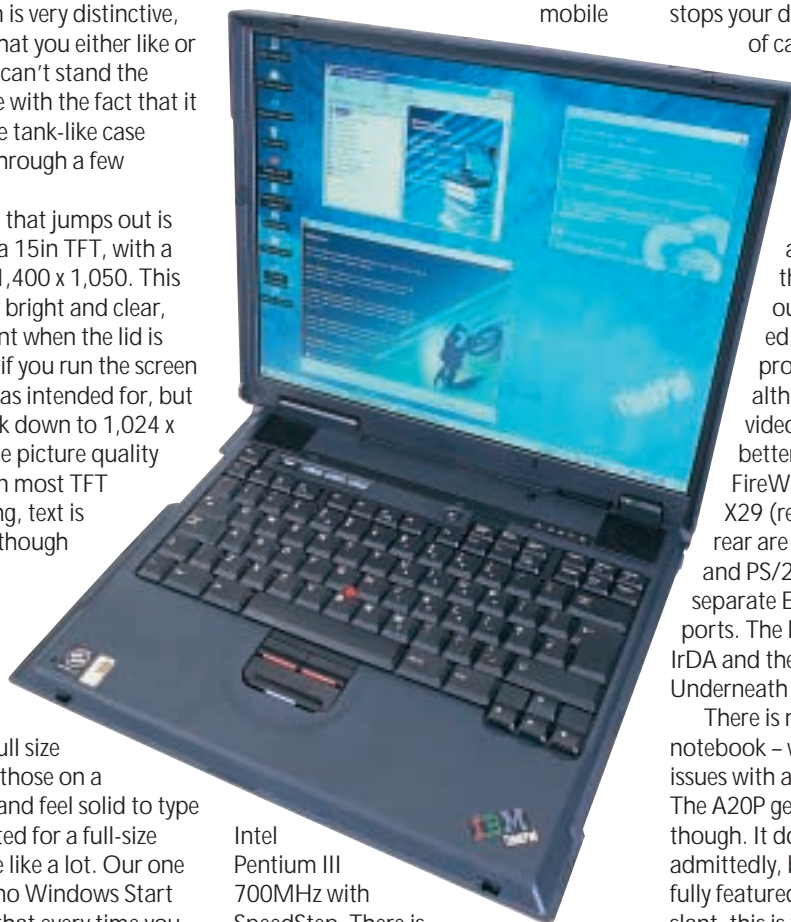
This isn't the fastest notebook known to man, but it was never intended to be, and the A20P's speed is more than adequate for most applications. The main thrust is provided by a mobile

next to the drive automatically puts the notebook into standby. Once it beeps, you can remove the drive and replace it with a number of optional extras, such as an LS-120, a second hard drive or second battery. This is an excellent feature that helps to keep the overall size of the notebook to a minimum and stops your desk being cluttered with lots of cables. An 18GB hard drive completes the basic specification.

Around the edges of the case are ports galore. The obligatory single Type III/two Type II PC Card slots are next to the DVD drive and there's also S-Video in and out ports for some basic video editing. MGI VideoWave III is provided to get you going, although if you need a mobile video-editing platform, you're better off buying a notebook with FireWire, such as the Sony Vaio X29 (reviewed on page 94). At the rear are parallel, serial, D-SUB, USB and PS/2 ports, together with separate Ethernet and V.90 modem ports. The left side has a floppy drive, IrDA and the standard three audio ports. Underneath is a docking port.

There is no such thing as a perfect notebook – we always have a few small issues with all the products that we see. The A20P gets fairly close to perfection, though. It does attract a price premium, admittedly, but if you are after a great fully featured notebook with a corporate slant, this is the one to go for.

JASON JENKINS



Intel Pentium III 700MHz with SpeedStep. There is also a healthy 128MB of SDRAM inside, a good amount for a notebook. Graphics come courtesy of an ATi mobility M3 chipset with a whopping great 16MB of RAM. This allows you to output a resolution of up to 1,600 x 1,200 to an external monitor and even play a few games (at a low resolution). We ran our standard Quake III test at 1,280 x 1,024 16bit with a result of 14.9fps – obviously unplayable. At 640 x 480 in 16bit colour, though, we got a result of 47.5fps – a lot better, proving that, although this is far from the ultimate games machine, it could be used for games as a sideline.

A Toshiba DVD-ROM (the six-speed SD-C2302) sits in IBM's Ultrabay 2000. This bay means that you can swap devices as you see fit. Flicking a switch

DETAILS

★★★★★



PRICE £2,888.15 (£2,458 ex VAT)

CONTACT IBM 0870 010 2512

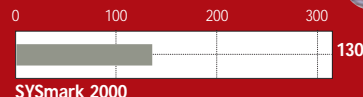
www.pc.ibm.com/uk

PROS Excellent build quality, screen and keyboard; speedy

CONS Trackpoint may annoy some; no FireWire

OVERALL A great fully featured notebook that feels as though it has been built to last

PERFORMANCE RESULTS



SYSmark 2000

Sony Vaio PCG-X29

If you're on the move and need to do some digital video editing, this is a good choice

It's time to come clean – we've got a bit of a soft spot for the design of the Sony Vaios, and this month we couldn't resist the opportunity to test out Sony's ultimate desktop replacement: the X29. With this product, Sony has attempted to take the desktop replacement concept one stage further, producing a mobile video-editing solution as well.

Inside the machine is a mobile Intel Pentium III 750MHz with SpeedStep technology, backed up by 128MB of SDRAM. This leads to a fast SYSmark 2000 score of 135. Sony has gone for an intercooler flap to help keep the insides at a sensible operating temperature. This flap folds out when you open the lid and looks very stylish. It certainly helps keep the Vaio virtually silent when operating. The flap does not automatically close when you shut the lid, however: for this you have to flick two catches underneath the unit.

The X29 comes with an excellent 14.1in screen, with a native resolution of 1,024 x 768. This has a protective screen in front of it secured by two easy-to-remove clips. Whether or not you'll find it useful will be a matter of personal preference, but it is there nonetheless. The keyboard is very good, with near full-size keys, a full-size return key and a very solid feel. The only slightly annoying feature is that the keys have a tendency to clatter a bit as you type. A decent touchpad sits below this, together with a couple of excellent mouse buttons.

There's a 6MB NeoMagic MagicMedia256XL graphics chip inside, and an 18.1GB hard drive for your files. There's no floppy inside the unit, but an external one is supplied, connected through a proprietary interface.

One Sony trademark, the jog dial, reappears on the X29. This is a fingertip-operated dial at the right-hand side of the notebook – you can rock it up and down to scroll through the jog-dial menu, and press to select. You can also customise the menu to add and remove applications and actions as you see fit, making it a very useful tool.

Other features of note on the notebook itself include an eight-speed Toshiba DVD-ROM (the SD-C2402),

headphone and microphone sockets, D-SUB and serial ports, USB, mini-FireWire (referred to as i.LINK by Sony), and two Type II PC Card slots (or one Type III). Unforgivably, though, there is no IrDA port. Sony supplies a 56K PC Card modem, and it's difficult to see how it could have been



integrated into the notebook itself.

The real secret to this notebook comes with its docking station. This clips onto the rear of the notebook and has its own fan to help keep everything cool. It contains virtually every port you could need. The full list: one i.LINK, S-Video out, composite out, D-SUB, Line in and out, two USB, DC, PS/2, optical digital out, serial and parallel. The serial port is shared with a control A1 II connector (you move between the two using a switch on the docking station). This port is used to connect certain types of CD and MiniDisc players to the notebook.

Sony bundles an enormous amount of software with the X29. Most of it is Sony-specific, such as DVgate, Media Bar, PictureGear and Smart Capture Video. These programs are for capturing and editing both video and stills from a

variety of sources. There's also a copy of Adobe Premiere 5.1 LE and McAfee VirusScan, though.

As a mobile DV editing solution, it does fairly well, but a PC could do better. We shot some test footage on a Sony Digital Handycam DCR-TRV20E DV camcorder and connected it to the Vaio to find out how well Sony has implemented DV editing. The

company's DVgate motion program gets all the clips onto your hard drive to start with, and this is fairly easy to use. You simply play the footage back on the screen, mark the points you are interested in and press the capture button to save a compressed version to your hard drive. Your best option is to use Adobe Premiere 5.1 LE to edit the video, then you can use DVgate motion to export the finished product back to the camcorder, providing it supports this. It took us around 30 minutes to create a two-minute film.

We still have a couple of issues with the concept of a video-editing notebook, however. First, a notebook, even a very highly specified one such as this, is never going to be as fast as a PC. For DV editing, you also want a large hard drive. Again, although 18.1GB of hard drive space is large for a notebook, it cannot rival PC hard drives that are now as large as 80GB. In other words: if you are looking for a video-editing solution and are torn between a notebook and a PC, go for a PC. If you need to edit video on the move, however, this Vaio is as good as they come and is the only sensible choice.

JASON JENKINS

DETAILS

★★★★★

PRICE £3,700.08 (£3,149 ex VAT)

CONTACT Sony 0990 424 424

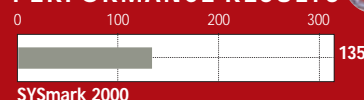
www.vaio.sony-europe.com

PROS All the ports you could ever need; well built and highly specified

CONS Very expensive; external floppy

OVERALL If you need a mobile DV editing solution, this is as good as it gets

PERFORMANCE RESULTS



SYSmark 2000

Samsung GT8650

A smart, fast machine that would free up space on any executive's desk

This notebook is billed as a desktop replacement, which is one way of saying that at a shade under 3kg it is a little heavy to carry around. In price and features it is aimed at the corporate market where a large proportion of desktop machines are being superseded by models that slot easily into a network and are just portable enough for occasional off-site work.

The GT8650 is the middle of three models with names reflecting their clock speeds: respectively they use 600MHz, 650MHz and 750MHz versions of Intel's battery-friendly SpeedStep PIII processors.

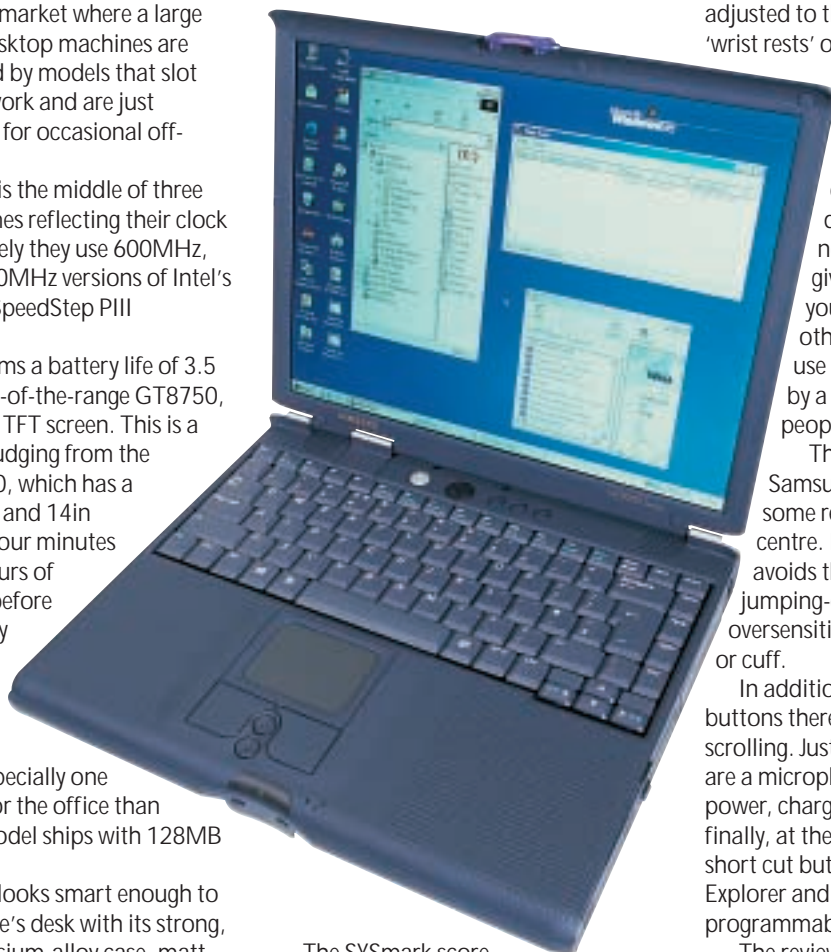
Samsung claims a battery life of 3.5 hours for the top-of-the-range GT8750, which has a 15in TFT screen. This is a little optimistic judging from the reviewed GT8650, which has a slower processor and 14in screen: it lasted four minutes short of three hours of fairly gentle use before signalling 'battery low'. Nevertheless, this is good for a machine of this performance; especially one designed more for the office than the road. This model ships with 128MB of RAM.

The GT8650 looks smart enough to grace an executive's desk with its strong, rounded, magnesium-alloy case, matt-steel on the outside and matt black on the inner surfaces, but it is marred slightly by a rather garish, delicate-looking blue latch.

On the right edge are a phone jack for the built-in 56K modem, a floppy drive and a 'flex-bay' that on the review machine housed a DVD drive – there are CD, hard drive or LS120 superfloppy options. There is also a floppy drive present.

Arrayed along the opposite edge are the battery compartment, a Kensington lock socket, twin slots for one Type III or two Type II PC Cards, line in, mic-in and headphone jacks, and a TV-out socket. The latter is particularly useful if you have the DVD drive, though it only carries the video signal so you couldn't use your TV for sound and would need separate active speakers if you didn't want to rely on the GT8650's internal ones.

At the rear of the machine are PS/2, 10/100 Ethernet, parallel, D-Sub, serial, USB and IrDA ports plus a connector for a proprietary docking station. The GT8650 has an ample 12GB hard drive.



The SYSmark score of 124 is respectable for a model of this class. It would be lower under battery operation, when the SpeedStep system clocks down to reduce power drain, but the performance would still be more than adequate for office tasks. If it isn't, you can opt out of SpeedStep and go for broke on the battery. The graphics subsystem, with 8MB of dedicated RAM, uses the S3 Savage/IX chip.

But ergonomics are at least as important as performance in a machine that, like a traditional desktop, can expect daily heavy-duty use. The 14in 1,024 x 768 pixel screen is easier on the eye than the average CRT and can be used comfortably for hours at a time. The GT8650 does have a fan, which means that it is not completely silent, but it is much quieter than most desktops. However, it runs too hot to sit it on your lap for long.

The keyboard, which occupies most of the upper half of the working surface, has a good bouncy feel. The 4in gap below it really does allow you to position your wrists comfortably if your chair is adjusted to the right height: so-called 'wrist rests' on more cramped models can simply get in the way.

This means that you are unlikely to want to plug in a keyboard, which would defeat the object of saving desk space by switching to a notebook. This is just as well, given that you would want your single USB port free for other peripherals with the dual-use PS/2 port left open for use by a mouse, for which many people find there is no substitute.

This is not to denigrate Samsung's touchpad, which for some reason is slightly left of centre. It works well enough and avoids the common, infuriating jumping-cursor syndrome caused by oversensitivity to the brush of a wrist or cuff.

In addition to left- and right-click buttons there are two for up and down scrolling. Just in front of the touchpad are a microphone and status lights for power, charging and 'new mail'. And finally, at the top of the keypad, are three short cut buttons: one each for Internet Explorer and Outlook, and one programmable to your choice.

The review model used Windows 98 but Samsung 'recommends' that businesses buy it with Windows 2000 pre-installed.

CLIVE AKASS

DETAILS

★★★★★

PRICE £2,525.08 (£2,149 ex VAT)

CONTACT Samsung 020 8391 0168

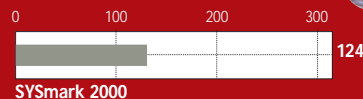
www.samsungpc.com

PROS Smart and speedy

CONS Single USB port a little limiting; the bottom of the machine gets very hot

OVERALL A sturdy machine that can double as a workhorse and executive toy

PERFORMANCE RESULTS



SYSmark 2000

Palm m100

This stylish low-end organiser still comes at a price: limited future-proofing and versatility

This neat design is intended to head off the Handspring Visor, which has been cutting into Palm sales at the cheaper end of the pen-driven handheld market. Both machines boast 2MB of RAM and use the Graffiti handwriting-recognition software running on the hugely successful Palm OS operating system that Handspring, formed by the people behind the original Palm Pilot, licensed from its new owner 3Com.

The m100, at 12 x 7.8 x 2cm (h x w x d) and weighing 4oz, is an ounce lighter and almost exactly the same size as the Visor but looks smaller. This is partly due to the fact that it is more streamlined, narrowing slightly at the waist to fit snugly into the hand – but also, less happily, because its 5 x 6.8cm screen is very slightly smaller than the Visor's in both directions. Subjectively this makes quite a difference to the viewing area.

Palm says a higher resolution compensates for the screen size. This is pushing it – small type, however crisp, is hard on the eyes – but readability is good in a variety of lighting conditions.

A fragile-looking black lid protects the screen and is well designed to flip back out of the way, flush with the rear. When closed it leaves one scroll-button accessible that, when pressed, shows the time in a small viewing window. An infra-red port, situated next to the hinge on the upper edge, can be used to exchange electronic business cards and other information.

The face panel on our review machine was blue. You can buy clip-on panels in other colours (silver mist, green mist, Pacific blue, ruby pearl) – though you may consider that £19 inc VAT is a little steep for a piece of moulded plastic.

Beneath the lid is the familiar Palm layout: a screen divided into writing and display areas, below which are two scroll buttons and four application buttons. By default the latter accesses the appointments, address book, to do list and a new notepad that allows you to jot down names and numbers without resorting to handwriting recognition.

The buttons are easily configured to link up to other applets, although the m100 lacks the expenses and email apps of its more expensive stablemates.

Just above the screen is the power-off button which, when held down, switches

with a cradle (or £117.50 inc VAT without).

The m100 comes with link software for the Mac but you need to buy an RS232-to-USB adaptor that costs £35 inc VAT.

The RS232 link slots into the expansion port on the lower edge of the m100. This is not compatible with other Palms, which could be a bad mistake: a Pilot owner buying an m100 for a friend could not, for instance, share the folding accessory keyboard and would have no reason not to look to Handspring instead. Even more so, because the Visors, with their Springboard ports, are designed from scratch for expansion. This is particularly important because any organiser bought now will date quickly when the emergence of Bluetooth connectivity finally allows the PDA to consummate its marriage to the mobile phone. By then the m100's RS232 link could look like something out of the Stone Age.

Springboard allows the Visor to be upgraded gracefully and already provides extensive options; m100 owners will have to wait for products to emerge. A fold-up keyboard is expected within a month, with a modem to follow – though the RS232 link, given the right software, should allow you to use almost any old modem.

The m100 is likely to appeal to people who like their personal organisers to double as a fashion accessory; but the Visors look cute, too, and they have the edge on value.

CLIVE AKASS



on the backlight. At the rear of the device are a pinhole reset, a slot for the stylus, and a bay for two AAA batteries.

Unlike the Palm IIIe, which it supersedes, the m100 does not come with a HotSync cradle by default. There's no flash card slot either. Instead you get an RS232 serial cable – already looking dated as USB ports become ubiquitous – with software that syncs with Microsoft Outlook. The cable is easy to use but less elegant than the cradle and more daunting for the many non-techies who go for this class of device.

You can buy a cradle for £28 inc VAT, but the fact that you need to makes the m100 look poorer value than the Palm IIIe, which is listed at much the same price (£130 inc VAT), and on a par with the Visor, which lists at £149 inc VAT

DETAILS

★★★★

PRICE £130 (£110.64 ex VAT), cradle £28 (£23.82 ex VAT), extra face plate £19 (£16.17 ex VAT)

CONTACT 0800 731 1064

www.palm.com

PROS Looks good and has most of the features that made Palm a market leader

CONS Cradle not bundled; poor future-proofing; incompatible with other Palm peripherals

OVERALL Does the job and should sell well on name, features and looks, but technically not as good a buy as its major rival, the Visor

EXCLUSIVE

Sony Mavica MVC-CD1000

A good-quality digital camera with enough features to keep professional snappers happy

In a world where it seems as though everyone is trying to cram more pixels into a smaller box it's refreshing to see one company doing something a bit different. It's hardly surprising that that company is Sony, whose latest Mavica MVC-CD1000 writes not to floppy disk or solid-state media, but to 8cm CD-R discs.

The benefit of using CD-R discs is that, like any other Mavica, you can use this camera without installing any drivers as the media can be swapped between camera and PC. There's a bundled adaptor to enlarge the discs to full size if your PC balks at 8cm media, but most don't so it's unlikely you'll need it.

The discs have to be initialised before use and finalised before a PC will read them, but both of these are quick to complete, and once it's been finalised you can reinitialise a disc to add more pictures at a later date without destroying your existing snaps.

The CD1000 is a beast of a camera, but although it's large, it's not heavy, tipping the scales at just 900g, battery included. It's comfortable to hold and has the reassuring feel of a professional piece of kit. You certainly won't be embarrassed to be seen using it. Around the back there's a 2.5in LCD, which easily rivals any other. The refresh is real-time, but if you don't want to use it there's another secreted inside an eye-piece. This is turned off by default, but it switches itself on whenever you put your eye up against it.

On the top there's a pop-up flash with three intensity settings and an anti-red-eye feature, which is supplemented by a hot-shoe attachment point. Focus can be set to manual or automatic, and exposure can be varied between +2EV and -2EV in one-third EV steps. The spot-metering function will come in handy, evening things up if you regularly have bright lights behind your subject – say Aunt Maude posing in front of a sunset – and white balance is automatic unless you have some burning desire to tweak it yourself.

With such a big body the steady-shot

facility is a welcome addition, especially if you take advantage of the MPEG1 movie encoding setting. This captures sound at the same time as moving video, but if you would rather keep things static you can still use the built-in mic to add voice memos to your snaps. A 10-second self-timer gives you just enough time to balance the camera and run into position, while for subjects closer at hand the macro mode will



take you as close as 2cm. Capacity-wise, you'll fit around 160 shots at the top 1,600 x 1,200 resolution in jpeg mode.

You'll have to look very closely to find evidence of compression on these, but if you'd rather opt for uncompressed tiff then the feature is there, but you'll only squeeze about 20 of these on each disc. There's an interesting '1,600 (3:2)' mode that records in the aspect ratio we're used to seeing come back from the developers, so there's no longer any need to put up with screen-shaped pics if you're more of a 'printer' than a 'browser'. Drop the resolution to 1,024 x 768 or 640 x 480 and you'll get 350 or 1,080 images respectively on each disc, but with 156MB to play with it hardly seems a worthwhile compromise. However, friends are unlikely to welcome a 1MB jpeg creeping through their modem, so the email setting will record a 320 x 240 version of whatever you're taking alongside the full-resolution image ready for electronic transmission.

You'll be able to take up to 1,100 photos on a full charge, or keep

snapping for 100 minutes, depending on which takes longer. It uses one of Sony's excellent InoLithium cells with accurate feedback so you know precisely how much juice you have left at any time through a gauge on the LCD or eyepiece monitor. A full charge takes between 150 and 210 minutes.

The zoom extends to 20x when you take the digital extension into account (10x without), but you can disable the digitised top end of this if you'd rather put all your faith in the lenses which, after all, always produce a better result, even if you do have to sacrifice the extra functionality. The control for this is located around the front of the unit, which makes it rather difficult to reach unless you have pianists' fingers.

We were disappointed that it's not possible to preview images before they are written to disc, because although you can delete them once they're taken, that used capacity is lost for good. It's also a shame Sony didn't opt for CD-RW as it would greatly reduce the running costs, but then you have to remember that regular 35mm film is technically an analog WORM format too, and with that you can't just print off another copy at home or email the results without a scanner, as you can here.

NIK RAWLINSON

DETAILS

★★★★★

PRICE £1,200 (£1,021 ex VAT); blank discs: £5 each (£4.26 ex VAT)

CONTACT Sony 08705 424 424
www.sony.co.uk

PROS First-class picture quality; professional feel; plenty of great features; fairly priced media
CONS It's not CD-RW; no option to preview shots; with such high media capacity we'd have liked to see more than 2.1 megapixels

OVERALL IBM's Microdrive is rewritable, has a higher capacity and can fit into smaller cameras, so to be honest we would prefer a camera that can accept this media. That said, the Mavica takes excellent photos and the added features make it a good choice for the professional looking to move to digital

Kodak DC4800

Kodak's latest digital offering opts for a unique wide lens to distinguish it from its competitors

Kodak's DC4800 is the highest resolution camera it has produced for the sub-£1,000 market, but unlike the 2,048 x 1,536 pixel images produced by other 3.3megapixel cameras we've tested, Kodak has gone for a new 2,160 x 1,440 pixel, 3.1megapixel CCD. This perfectly matches the 3:2 aspect ratio of 35mm film, producing pictures that are half as wide again as they are tall. Interestingly, several 3.3megapixel cameras also offer a 3:2 aspect ratio mode, but do so by cropping the vertical resolution of the image and slightly reducing the quality.

Using the generally accepted rule that a colour inkjet printer is happy being fed around 200 pixels per printed inch, the Kodak DC4800 is capable of producing prints up to 12 x 8in before you start seeing the pixels. The maximum 3.1megapixel resolution is available at two levels of jpeg compression and in an uncompressed 9MB tiff mode. Lower resolution 1,800 x 1,200, 1,536 x 1,024 and 1,080 x 720 pixel modes are also available, all in the 3:2 aspect ratio.

At the best quality 3.1megapixel jpeg setting, our file sizes measured between 450 and 950KB, although it averaged at around 600KB. Considering other 3.3megapixel cameras we've tested produced best-quality jpeg files ranging from 800 to 2,400KB, the 4800 has its compression turned up quite high. Memory-wise, Kodak has stuck with the Compact Flash (CF) format and supplies a 16MB card as standard, good for about 16 pictures at best jpeg quality. Sadly the 4800's CF slot will not take IBM's Microdrive hard disk.

Like most cameras in this price bracket, the 4,800 features a 3x optical zoom lens, equivalent to 28-84mm on a 35mm film camera; the actual specification is 6-18mm, f2.8-4.5. The widest focal length that most digital cameras achieve is equivalent to

somewhere between 32 and 40mm, so the wider 28mm setting on the 4800 is both unique and very welcome; note that at 28mm, the tip of the lens barrel is visible in the optical viewfinder. In macro mode, the 4800 focuses no closer than 20cm, which is the same as Epson's and Olympus' latest, but nowhere near the 4cm and 2cm of the Sony S70, Nikon 990 and Sony F505V.

Kodak has fitted a 1.8in TFT screen, although the 3:2 aspect ratio of its images means there's a thin black bar running along



the top; in playback mode you can zoom in two or four times. As with earlier Kodak cameras, the menu navigation and icons are colourful and friendly. The flash, which pops up manually, can be forced on or off, left on auto or set to red-eye reduction.

The relatively small 4800 weighs 320g without battery and features easy-to-access adjustment dials on the top. One dial directly adjusts exposure compensation from +/-2EV, albeit in 0.5 steps compared to most camera's one-third steps, while the other switches between automatic, playback, setup and the three aperture priority settings of f2.8, 5.6 and 8. You can manually choose 19 shutter speeds from 0.5 to one-thousandth of a second or from 0.7 to 16 seconds in long exposure mode, but these are all only accessible from within a menu system – not particularly convenient. Within the menus you'll also find three metering options as well as the facility to create images with increased saturation.

Interestingly, Kodak has dumped its traditional set of four AA batteries for a single rechargeable lithium ion – the bundled power supply recharges this in four hours, although an optional one-hour fast charger is also available. Connection to your PC is with USB, after which the camera's memory is mounted as a removable drive from which you can drag files. There's also a video output to your TV, although disappointingly no movie-capture mode.

Writing tiffs takes 50 seconds, which is par for the course, although at 15

seconds to view one, it's fairly nippy.

Images certainly look pretty good, but the high level of compression at even the best-quality jpeg setting can be slightly unforgiving and eliminates ultimate detail in many compositions. Admittedly you have to look very closely, but directly compared to others, you can spot it.

Coupled with the lack of video capture, Microdrive incompatibility, modest macro and slightly convoluted control over shutter speed, the 4800 loses brownie points. On the upside, the 3:2 aspect ratio is a preferable shape and the wide 28mm lens much appreciated. Ultimately, we prefer the broader features of 3.3megapixel models from Sony, Olympus and Epson at this price range, but the 4800's wide lens and 3:2 images may swing it for some users.

GORDON LAING

DETAILS

★★★★★

PRICE £699.99 (£577.49 ex VAT)

CONTACT Kodak: 0870 243 0270

www.kodak.com

PROS Aspect ratio that matches 35mm and a wide 28mm lens setting

CONS Compression a little high; no movie mode; doesn't take IBM Microdrive

OVERALL Good overall camera, but features beaten by others

nVidia GeForce2 Ultra

If you're a gamer willing to pay serious cash for lightning-fast graphics then nVidia has the answer

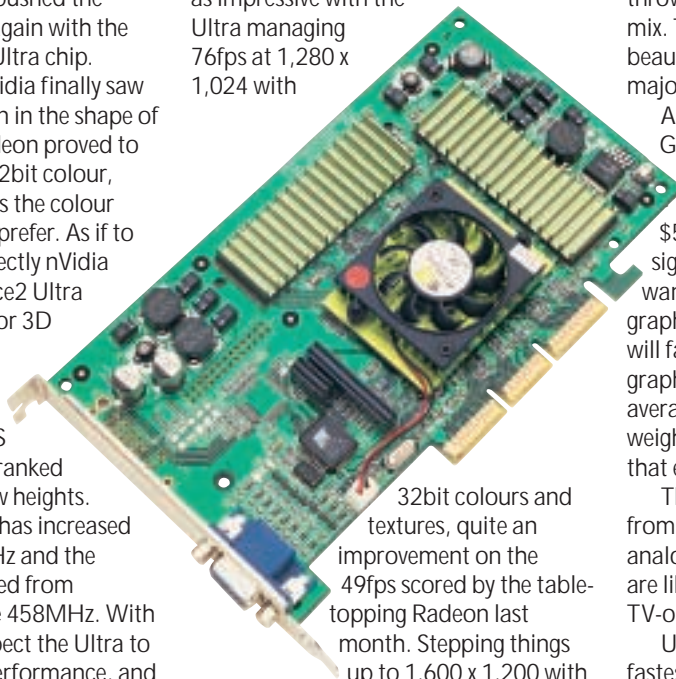
It would appear that nVidia has its research and development team working overtime these days. With the 3D world still reeling from the raw polygon-pushing power of the GeForce2 GTS chipset, nVidia has pushed the graphics envelope once again with the release of the GeForce2 Ultra chip.

Only a month ago nVidia finally saw some serious competition in the shape of the ATi Radeon. The Radeon proved to be a great performer in 32bit colour, which, given the choice, is the colour depth that most gamers prefer. As if to answer this challenge directly nVidia has produced the GeForce2 Ultra and set a new standard for 3D graphics performance.

The Ultra shares the same core as the already impressive GeForce2 GTS chipset, but nVidia has cranked up the clock cycles to new heights. The GPU core frequency has increased from 200MHz to 250MHz and the memory speed has jumped from 333MHz to an incredible 458MHz. With specs like these you'd expect the Ultra to produce lightning-fast performance, and that's exactly what it does.

We placed the GeForce2 Ultra card in the same machine that we used for the October graphics card group test. This system consists of a 733MHz Intel Pentium III CPU backed up by 128MB of 800MHz RAMBUS memory. Needless to say, the Ultra more or less wiped the floor with all the cards we tested last month when it came to raw performance. Running 3DMark at 1,280 x 1,024 in 32bit colour the Ultra turned in a score of 4,385 compared to 3,420 from the ATi Radeon that topped the

graph last month. Pushing the resolution up to 1,600 x 1,200 in 32bit colour resulted in a score of 3,304 compared to 2,589 again from the ATi Radeon. OpenGL performance proved to be just as impressive with the Ultra managing 76fps at 1,280 x 1,024 with



32bit colours and textures, quite an improvement on the 49fps scored by the table-topping Radeon last month. Stepping things up to 1,600 x 1,200 with

32bit colours and textures resulted in a staggering score of 54fps.

It would appear that the Radeon's reign as the best graphics card for 32bit 3D performance was very short lived with nVidia answering the challenge swiftly with a lightning-fast graphics solution. That said, 3D gaming is not measured on performance alone and although the Ultra is fast it's still a bit lacking in the features area. Firstly, the Ultra, like all the GeForce family, still doesn't support hardware environment bump mapping, unlike the ATi Radeon.

It's a bit of a mystery why nVidia hasn't incorporated bump mapping, although it could just be a simple matter of space. Bump mapping is a way to produce very realistic surfaces without the need to throw thousands of polygons into the mix. Therefore, it can produce a beautiful looking surface without a major performance hit.

Another aspect that makes the GeForce2 Ultra seem a little less attractive is the price. With nVidia estimating the price of the Ultra at \$500, it's going to represent a significant investment for anyone who wants to be at the cutting edge of 3D graphics. Of course there are people who will fall over themselves to buy the fastest graphics card available, but for the average gamer it will be a case of weighing up how much more enjoyment that extra performance will give them.

The reference board that we received from nVidia was equipped only with an analog D-SUB output, but retail boards are likely to sport extra features such as TV-out and DVI connectors.

Ultimately, the GeForce2 Ultra is the fastest graphics chipset we've ever seen, and if you have deep pockets and a need for speed you're probably counting the days until retail boards appear.

RIYAD EMERAN

DETAILS

CONTACT www.nvidia.com

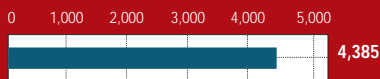
PROS Fastest graphics chip by a very wide margin

CONS It's going to be very expensive

OVERALL Like a Ferrari, people will want it regardless of whether they really need the speed

PERFORMANCE RESULTS

3DMark 1,280 x 1,024 32bit



GeForce2 Ultra

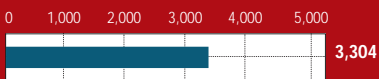


ATi Radeon



Hercules 3D Prophet-II 64MB

3DMark 1,600 x 1,200 32bit



GeForce2 Ultra

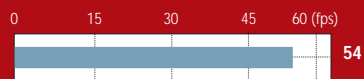


ATi Radeon

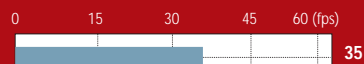


Hercules 3D Prophet-II 64MB

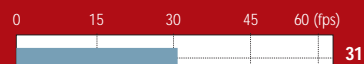
Quake III 1,600 x 1,200 32bit



GeForce2 Ultra



ATi Radeon



Hercules 3D Prophet-II 64MB

Matrox Millennium G450

Matrox focuses on 2D graphics and targets its latest card at professionals on a budget

It's been quite a while since we've seen any new graphics products from Matrox, but now it has come up with the Millennium G450.

This time it's not the 3D features Matrox is showing off; instead it is after the professional user on a budget. Matrox has always had a reputation for making excellent 2D cards and the G450 doesn't change anything there, but it's not a breakthrough when it comes to 3D performance.

Essentially the G450 is a Millennium G400 with a 360MHz RAMDAC, faster memory and improved dual-head features such as Maxview (the ability to maximise a window on one monitor rather than

across both in Windows NT and 2000).

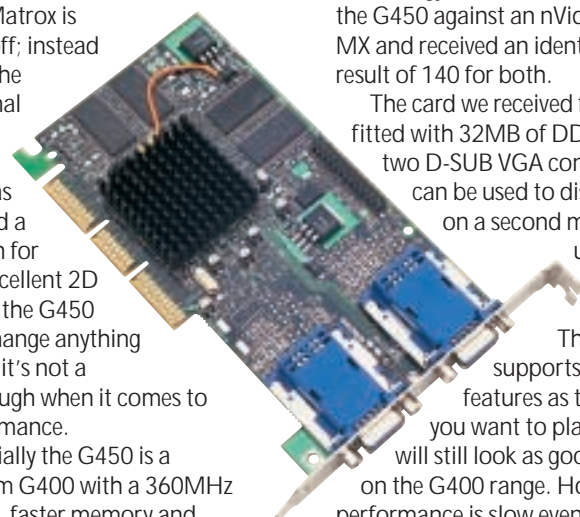
Matrox has integrated a lot of the original components of the G400 onto a single chip, produced using 0.18micron technology. As its focus is 2D, we tested the G450 against an nVidia GeForce2 MX and received an identical Sysmark result of 140 for both.

The card we received for review was fitted with 32MB of DDR memory and two D-SUB VGA connectors, which can be used to display the picture on a second monitor or a TV using a lead that Matrox supplies.

The G450 supports the same list of features as the G400, so if you want to play games they will still look as good as they did on the G400 range. However, 3D performance is slow even when compared to similarly-priced cards such as those based on nVidia's GeForce2 MX. This makes the Millennium G450 a

good card if you need multiple displays, but not such a good choice if raw 3D speed is more important to you.

LARS-GÖRAN NILSSON



DETAILS

★★★

PRICE £112.80 (€96 ex VAT)

CONTACT Matrox 01753 665 500

www.matrox.com

PROS DualHead; TV-out; good performance in windows; cheap

CONS Not very good 3D performance

OVERALL A great card for the professional user who needs more than one monitor

PERFORMANCE RESULTS



Asus AGP-V7100

A high-performance MX-based graphics card incorporating the latest TwinView architecture

Hot on the heels of last month's graphics card group test, another of the new-generation high-performance budget graphics cards employing nVidia's GeForce2 MX GPU has arrived in the form of the Asus AGP-V7100.

The first of the MX cards we've seen to employ the TwinView Architecture, the card's packaging tells us the V7100 can have simultaneous and independent dual-video output. This means you should be able to run a monitor out of the VGA output and/or a television through either the S-Video or composite socket. So, theoretically, it allows you to watch your television while someone surfs the net on the monitor. Unfortunately, despite the presence of the relevant hardware sockets, there is no option for simultaneous use of the

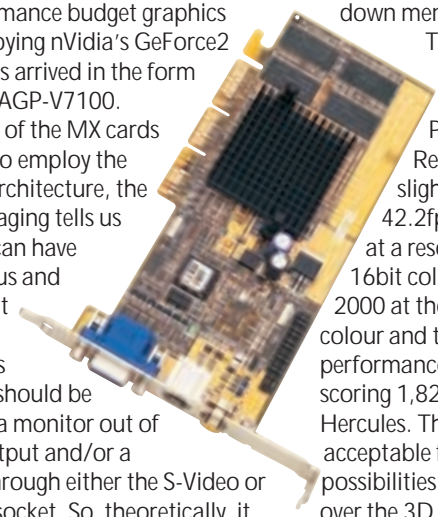
outputs in the included software. Despite this, switching between the television and monitor is a simple drop-down menu selection process.

The performance is pretty good, although in comparison to the Hercules Prophet II MX (PCW/October, Reviews p92) the Asus is slightly slower, pumping out 42.2fps to the Prophet II's 45.3fps at a resolution of 1,280 x 1,024 with 16bit colour and textures. 3DMark 2000 at the same resolution with 32bit colour and textures shows similar performance comparison with the Asus scoring 1,828 to the 1,974 from the Hercules. The scores are perfectly acceptable for the price and the output possibilities give the card a versatile edge over the 3D Prophet II MX.

Bundled with the card are S-Video and composite cables as well as Asus' DVD 2000 player. Drivers are included for Windows 2000, 98 and NT. It may not be quite as fast as the other MX card

we've reviewed, but it has more features and is a good bundle.

SCOTT MONTGOMERY



DETAILS

★★★★

PRICE £151.58 (€129 ex VAT)

CONTACT Ultimate Hardware 0845 1000 170

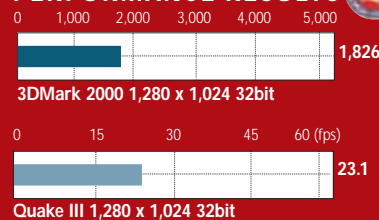
www.ultimate-hardware.co.uk

PROS Good cable/software bundle

CONS Drivers do not support the promised simultaneous outputs

OVERALL The software and cables make it a good overall bundle, but Hercules' MX is faster

PERFORMANCE RESULTS



Creative DAP JukeBox

An MP3 player that adapts to new formats and has a look worthy of the London Design Museum

Creative's DAP is not your common-or-garden MP3 player. About the size of a CD Walkman, it can handle any current music format. As new formats are developed you can simply download a BIOS patch from Creative's website to get your DAP to recognise them.

Within its curvy shell lives a 6GB notebook hard drive that, if you choose to rip your tracks to MP3 format, will hold the equivalent of around 150 discs. The real bonus though, is that with so much capacity at your disposal you'll not need to use such a low bit rate that it sounds like your music's coming through on a short-wave radio – you can choose anything from 20 to 320Kbits/sec. Ripping is such a quick process, averaging around 4.5x speed,

and the software lets you store a copy of everything it rips on your hard drive.

If you're connected to the Internet the ripping software will grab track names from CDDB (CD database), which shouldn't have any problems finding just about anything you can throw at it, and this information is used to index your music on the player. All ripped tracks are indexed by artist, album or genre, allowing you to construct playlists when it comes to playback.

At the front there's an infra-red port for a planned remote, and it comes bundled with rechargeable Ni-MH (nickel metal hydride) batteries, which Creative claims should have a life of

around five hours, although with our beta test unit this proved slightly optimistic. The unit comes in blue or silver and opinion in the PCW office was pretty much split as to whether or not we found it attractive. Whatever our conclusion, though, someone likes it – there's one in London's Design Museum.

NIK RAWLINSON



DETAILS

★★★★★

PRICE £349 (£297.02 ex VAT)

CONTACT Creative 01189 344 744

www.europe.creative.com

PROS 150 CDs in a CD Walkman-sized device; future-proof upgradability

CONS Battery life could be improved; not that cheap

OVERALL If you think of it as an MP3 player you're underselling it – this is the first and only practical way to carry all your best CDs with you wherever you go, but it comes at a hefty price

CTX PR1400F

Weighing in at a hefty 38kg this flat-screen monitor offers excellent performance for the price

Sitting at the top of CTX's professional series of CRT monitors, this 21in model uses a truly flat FD Trinitron tube from Sony. With a grille pitch of 0.24mm and a viewable diagonal of 19.8in, the screen is large enough for use by design professionals. It also weighs in at a hefty 38kg, but once hoisted onto your workspace the effortless swivel base belies its true mass. The maximum resolution is stated as 2,048 x 1,536 at 75Hz, but in fact, most users will prefer 1,280 x 1,024 at 85Hz.

The first thing we noticed is the lack of reflection. Glare is minimal, and the darker screen coating helps to enhance contrast. Image brightness is excellent – a virtue of the aperture-grille design – while colour shading and purity is equally

impressive. Power regulation is also very stable indicating that the electronics have a tight rein on the electron beams. Corner-to-corner focus is commendable and text is sharp. No display is flawless,

however, and although horizontal colour convergence is excellent, a little mis-convergence exists in the vertical direction.

In addition, some streaking is evident, together with a slight inwards curvature to the top corners of the screen that we couldn't eliminate.

As for connectivity, there's a non-captive D-SUB at the rear, joined by one upstream and two downstream USB ports. Two more USB ports are on the right side of the unit for easy access. BNC connectors are present too, selectable from within the OSD.

The four-button operated OSD is easy to navigate thanks to its simplistic

graphical menu system. Although not as extensive as some monitors in this price range there are five languages to choose from.

Overall, the CTX PR1400F puts the FD Trinitron tube to good use, and at £599 ex VAT it is around £100 less than Sony's G500, which uses the same tube. If you're tight on cash it's a good option.

JALAL WERFALLI



DETAILS

★★★★★

PRICE £703.83 (£599 ex VAT)

CONTACT CTX 01923 810 800

www.ctxmonitors.com

PROS Favourable price/performance ratio; solid screen regulation

CONS Geometry is not quite spot on; evidence of streaking

OVERALL Cheaper than Sony's package; this monitor represents good value. Minor geometry and streaking issues keep it from a full row of stars

Samsung MP3 phone

The Samsung M100 mobile phone/MP3 hybrid struggles to make the best of both worlds

It seems that everyone is adding MP3 players into devices these days, and Samsung is no exception – its latest wheeze is to put one inside a mobile phone, the M100.

As a phone, it is fairly good, although we did not find the software quite as intuitive as that on Nokia's phones. The silver unit is very light at only 97g and is very small at 4 x 10 x 2cm (w x h x d). Unfortunately, there's no integrated antenna so this protrudes another 2.5cm.

The dual-band M100 features an active flip that helps to stop accidental key presses. The lightweight li-ion battery gives a claimed talk time of up to 180 minutes and a standby time of 60 hours. There's an infra-red modem, a basic calendar organiser, space for 99 numbers (plus a further 200 on the Virgin SIM) and vibration alert. Unfortunately, it does not support predictive text input.



Although the phone itself is fairly good, the MP3 side of things is little more than a gimmick. The phone has a small 32MB of memory, meaning that if you want to store an album's worth of songs on the phone, you'll have to sacrifice the quality.

Connection to a PC is via the parallel port – apart from the fact that people are likely to have a printer connected to this port, a USB connection would have been a lot quicker and more user-friendly.

The supplied software is adequate – it's a simple file management program for the phone, but what would really have put the icing on the cake would have been the inclusion of a ripping program. You listen to your music using the combined headphone/hands-free lead that includes a decent remote. You can easily answer a call using this and the music

cuts out to let you know that the phone is ringing. There's also a copy of Easy GSM software included, which allows you to manage the information on your phone's SIM, send email and SMS messages, among other things. This operates via the infra-red connection, however, an option to connect using the cable provided for MP3s would have been more sensible.

JASON JENKINS

DETAILS

★★★★

PRICE £349.99 (£297.86 ex VAT); Connection £12.50 (£10.64 ex VAT)

CONTACT Virgin Mobile 0845 6000 600

www.virginmobile.com/mobile

PROS Small, light phone; stylish

CONS Expensive; MP3 functionality more of a gimmick; no predictive text input

OVERALL A good present for the person that has everything, but otherwise you'd be better off buying separate units

Canon CanoScan N1220U

A compact scanner with excellent software, but don't forget your English-Spanish dictionary

This new USB flatbed scanner from Canon is instantly remarkable if for no other reason than its size – it is stunningly compact. Slightly larger than an A4 notepad and only 34mm in depth.

The N1220U is silver, has an optical resolution of 1,200 x 2,400dpi, which can be interpolated up to 9,600dpi, 42bit colour depth and is bundled with Photoshop 5 LE. There is a start button at the front and a single USB port at the rear.

It ships with a software bundle that includes the Canon CS-U TWAIN module for scanning from within an image-editing application, the ScanGear Toolbox CS desktop scanning utility, Arcsoft PhotoStudio 2000, ArcSoft PhotoBase, and Caere OmniPage Pro OCR software.

Installing the TWAIN driver was more

a case of plug and sigh than plug and play. The install hardware wizard was unable to locate the English driver on the CD on three different PCs so we had to resort to installing the Spanish version.

Even in Spanish though, the scanner performed faultlessly, generating a 10 x 8in (slightly smaller than A4) preview in around 15 seconds and a 150dpi colour scan in 42 seconds. The quality of

reproduction from the test colour print was nothing short of superb with well-resolved image detail, clear, well-saturated colour and good tonal range.

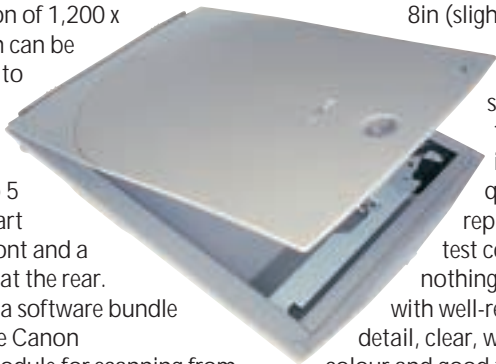
The TWAIN module operates in one of two modes, simple and advanced. In simple mode (*Modo simple*) you just specify the image type and required resolution, preview and crop the image, and then scan. Advanced mode (*Modo*

avanzado) gives you more pre-scan control over brightness and contrast, the gamma curve and histogram.

If your images aren't destined for an editing application you can scan directly from the desktop using the excellent ScanGear Toolbox CS.

The combination of compactness and quality combined with an excellent software bundle and supreme ease of use makes this new Canon *numero uno* in anyone's language.

KEN MCMAHON



DETAILS

★★★★★

PRICE £149 (£126.81 ex VAT)

CONTACT Canon 0121 680 8062

www.canon.co.uk

PROS Excellent quality, very compact

CONS Installation difficulty

OVERALL Compact; easy to use; superb results. This is surely the future of flatbed scanning

Siemens WAP phones

Two phones with little to distinguish between them except the services that they provide

Siemens is currently putting an awful lot of money into promoting its new WAP mobile phones, and so we thought it would be an ideal time to take a look at two of its latest models, the C35i and the M35i.

Both of these phones are broadly similar, with the main difference being that the M35i has an integrated antenna, and is exclusive to Virgin Mobile. Both the M35i and C35i are dual-band phones, so they have the ability to work abroad, with the exception of the US – which countries it will work in will depend on the agreements your operator has with foreign networks.

Both phones are fairly small and compact, measuring approximately 12 x 4.5 x 2cm (h x w x d). The M35i is slightly heavier than the C35i, but this is because it features what Siemens describes as improved resistance to water, shock and dust. This gives the outside of the M35i a slightly more rubberised feel than the C35i. It also makes the process of inserting the SIM card slightly harder as to open the battery/SIM compartment you have to turn a catch using a coin. This is done to make sure that there is a good seal between the cover and the waterproofing inside.

The software is the same on both phones, although Virgin has chosen to customise it slightly on the M35i so that you can access the Virgin extras easily from the main menu. Navigation is fairly easy; each of the buttons at the top of the phone can be used in two different ways depending on which side of the button you press. If you want to return to the previous menu you simply have to press the hang-up button, which doubles as the power switch. In addition to the number keys, there is a dedicated phone book button. Both phones can store up to 100 numbers in addition to the amount that the SIM holds.

Both phones have the same small, high-resolution

screen and, while this does help to keep the cost of the phones down, WAP pages tend to be coded for slightly larger screens, meaning that we frequently had to scroll down to see the end of a page that would have fitted on other phones' screens.

Both have the same NiMH battery, with a claimed talk time of between 90 and 300 minutes and a standby time of 50-180 hours. Writing text messages is easy and the C35i and M35i support T9 intelligent typing. Each phone also has 20 ring tones, together with the ability to compose your own. However, neither comes with IrDA.

The phones are network locked – the M35i to Virgin Mobile and the C35i to BT Cellnet in our case. Both of these are pay-as-you-go phones, although you can set up a direct debit on Virgin. The latter is a

relatively new entrant to the mobile phone scene, and is one of the new generation of 'virtual operators' – it uses One2One's infrastructure, so bear this in mind when thinking about whether it will work in your area.

The phones support WAP 1.1, and it is as easy to enter a WAP address on these phones as it is on any other – after quite a few key presses you'll see the page. After using both companies' WAP services for a few days, we have to say that we prefer Cellnet's. Apart from anything else, it was more reliable, with no dropped calls or connection problems. However, we had more problems connecting to Virgin's service – we repeatedly saw an error message when dialling. Where Virgin did impress

us, however, was in how easy it was to set the phone up – the documentation is superb, making Virgin an ideal choice for someone who has never owned a mobile before. When browsing, one of the menus has multiple layers, which you access by repeatedly pressing the right of the right-hand key, and select by pressing the left of the right-hand key. This takes some getting used to but is still a fairly good idea. For our money, though, you still can't beat the wheel on Nokia's 7110 for WAP browsing.

As phones, we prefer the M35i simply on the basis that it has an integrated antenna, making it a better choice for someone who keeps their phone in a pocket. The software and controls are the same on both, so neither has the edge there, but if we had to pick one for WAP, it would be the C35i on Cellnet as its service proved to be a lot more reliable.

JASON JENKINS



Top: Siemens C35i
Bottom: Siemens M35i

DETAILS

★★★★★

SIEMENS M35I

PRICE £119.99 (£102.12 ex VAT), connection £12.50 (£10.64 ex VAT)

CONTACT Virgin Mobile 0845 6000 600

www.virginmobile.com/mobile

PROS Water resistant; integrated antenna; easy to use; excellent documentation

CONS WAP service wasn't the best

★★★★★

SIEMENS C35I

PRICE £79.99 (£68.08 ex VAT) (Cellnet Pre-Pay)

CONTACT BT Cellnet 0800 917 3094

<http://theshop.btcellnet.net>

PROS Same software as the M35i

CONS External antenna

OVERALL If you are looking for a new phone either of these would be a good bet, but for WAP, it has to be the C35i

HP Deskjet 990Cxi

With an easy setup and a multitude of unique selling points this printer is ideal for small offices

HP calls it cyber white, but it's not far from the ivory of a regular PC. In its favour, though, it is less curvy than most other printers and it's pretty fast too, printing our standard test photo scaled to A4 in just four minutes 51 seconds. Quality proved to be good with smooth transitions between colour shade variations and realistic skin tones, which are traditionally difficult for a printer to produce. We used HP's proprietary photo paper but there was no need to tell the driver. A smart scanning light senses what's loaded and adjusts the printer accordingly.

Duplexing comes as standard,

courtesy of an attachment at the back that increases the overall depth of the unit by a not excessive 3in. There's also an infra-red port to the front, which allows you to print directly from IR-equipped notebooks, PDAs, cameras and mobiles.

The extensive driver allows for 27 paper types in 18 sizes supplemented by a user-defined option, as well as taking care of double-sided printing, poster printing and squeezing more than one page onto a sheet. HP has never caused any headaches when it comes to installation, but this time it was quicker and easier than ever. 'Normal' print quality was easily

good enough to be used for important business documents and the only difference we could see between this and the 'high' setting was the amount of time it takes to complete. Our 95-page mixed content test document of text and greyscale images printed in just under 26 minutes when set to 'normal' so it won't rival a laser if you print high volumes, but if you are a home or small office user it's certainly worth consideration.

NIK RAWLINSON



DETAILS

★★★★★



PRICE £249 (€211.91 ex VAT)

CONTACT HP 0990 47 47 47 www.hp.com

PROS High-quality text and photos; duplexing as standard; IR and USB capable

CONS A little pricey

OVERALL So many unique selling points you can excuse the slightly high price. If you don't need IR and duplexing, though, consider your options carefully

Philips Vesta Pro Scan

Although suited to the role of deskcam, the Vesta falters when it comes to demanding OCR tasks

This webcam-like device looks for all the world like something that might appear out of *Inspector*

Gadget's hat. The egg-shaped camera sits atop a small metal tripod with extendable legs and a ball and socket head.

The reason for the tripod is that, in addition to the usual functions – photo snapshot and video-conferencing – this camera doubles as a desktop scanner with OCR capabilities.

The document to be scanned lies flat on your desk and you position the tripod-mounted camera above it with the lens pointing directly downward. Fire up the Xerox PageCam software, manually focus the image, press the capture button and the software automatically scans the text which you can then copy and paste into another application.

With the tripod legs at maximum extension you can cover an area roughly

A6 in size. The success of any OCR operation depends on the light quality as well as of the original document.

Setup can be a little fiddly, with minor adjustments having to be made to get the framing right.

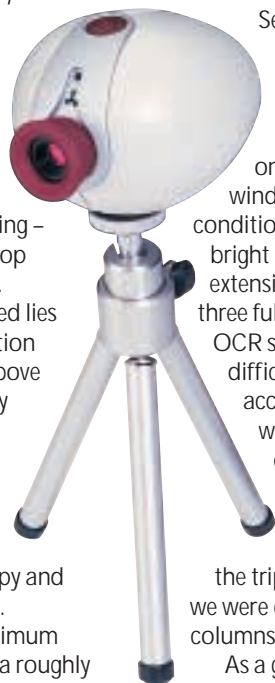
We tested the Vesta Pro on newspaper text by a window – fairly optimal conditions offering diffuse, but bright daylight. At full height extension we were able to fit in three full columns of text, but the OCR software clearly had difficulty recognising it. The accuracy was so poor that it would have been quicker to enter the text manually than correct it.

Dropping the camera down one extension on the tripod worked wonders – but we were only able to fit in two columns – about 200 words.

As a general purpose deskcam,

the Vesta Pro works well and is bundled with Smithmicro Videolink mail, Microsoft Netmeeting 2.1 and Ulead Photoexpress 2.0 SE. For grabbing small text clippings and turning them into text it works well, while the tripod makes capturing small 3D objects a breeze. But for anything more demanding on the OCR front it comes nowhere near the capabilities of a cheap flatbed.

KEN MCMAHON



DETAILS

★★★

PRICE £80 (€68.09 ex VAT)

CONTACT Philips 0800 169 8430

www.philips.com

PROS Good all-round performance; handy for short text clips

CONS Poor OCR performance on small text; fiddly framing; very dependent on light conditions

OVERALL No substitute for a flatbed, but handy for the odd short clipping

EXCLUSIVE

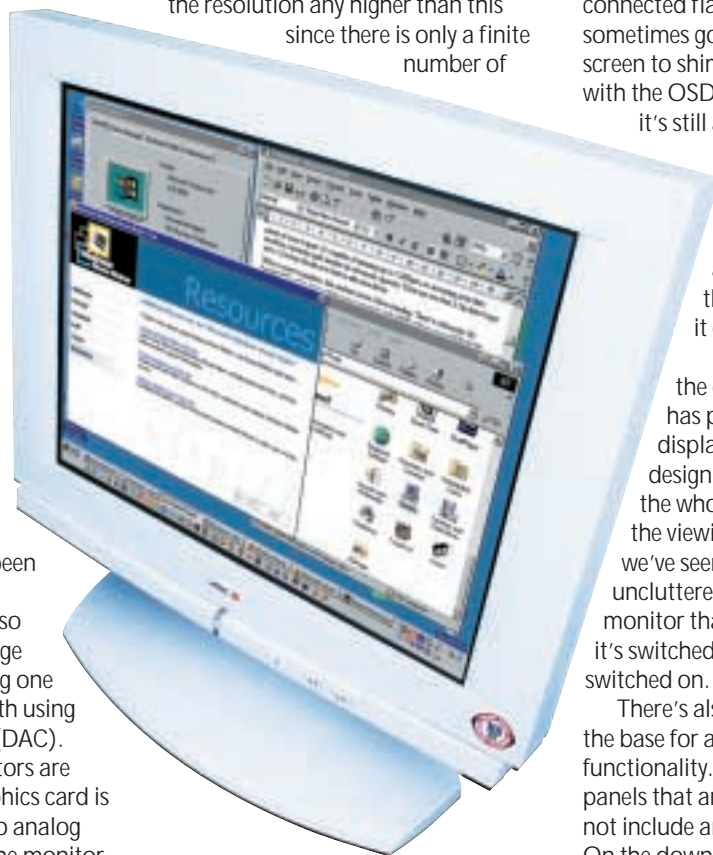
Mitac 18NE-TV

A digital flat-panel monitor whose performance and design demand a closer look

LCD flat-panel monitors are nothing new; they've been around for a few years, but only those with very deep pockets have been able to afford them. Although the cost of flat-panel monitors has dropped of late, you're still going to be paying considerably more for an LCD than you would for a CRT. It's possible now to buy a 15in flat-panel monitor for as little as £599 ex VAT, but you'll only be able to run a maximum resolution of 1,024 x 768. With today's graphics cards, resolutions above 1,024 x 768 are becoming the norm, both on the desktop and in 3D games. To cater for this we've started to see more and more 18in flat-panel monitors appear that can handle a resolution of 1,280 x 1,024, but these units carry a high premium. Regardless of what size of flat panel you go for, one thing has always been constant: the input method.

CRT monitors are analog so the graphics card has to change its digital signal into an analog one that the monitor can work with using a digital to analog converter (DAC). However, because LCD monitors are digital, it means that the graphics card is converting the digital signal to analog using its internal DAC, then the monitor is converting the analog signal back to a digital one using an analog to digital converter (ADC). It doesn't take a genius to work out that this doesn't make much sense, but since the analog D-SUB connector has become the *de facto*

The Mitac 18NE-TV is the first digital flat panel that we've seen sold separately. We've seen digital panels sold as parts of PC systems before, but usually they connected to proprietary video cards rather than DVI. The 18NE-TV is an 18in panel so you get a native resolution of 1,280 x 1,024. Obviously you can't push the resolution any higher than this since there is only a finite number of



pixels in the panel, but you can drop the resolution lower if you desire. It's when you do this that you notice one of the limitations of LCD over CRT technology.

If you drop the resolution, not all of the pixels are being used so letters and

have paid a lot of money for the native resolution in the first place.

There's no doubt that connecting a flat panel to your graphics card digitally is far superior to an analog interface. The picture produced by the Mitac is clear and vibrant without the slightest hint of shimmer. The problem with an analog-connected flat panel is that the clock can sometimes go out of sync causing the screen to shimmer slightly. A quick fiddle with the OSD will usually solve this, but it's still an annoyance. Also with a digital connection you don't have to worry about screen adjustments, since the image will always fit perfectly. As such, the Mitac has no controls on it other than brightness.

Besides the superiority of the digital connection, Mitac has produced a first-class display in terms of lighting and design. The lighting is even across the whole surface of the screen and the viewing angle is one of the best we've seen. Add to this the slim and uncluttered bezel and you have a monitor that's as good to look at when it's switched off as it is when it's switched on.

There's also a powered USB hub in the base for added value and functionality. Unlike some of the DVI panels that are appearing, this one does not include an analog D-SUB connector. On the down side it means that you can't connect more than one computer to it at once, but on the up side you're saving the cost of the D-SUB connector and the ADC that is needed to make it work.

Mitac has pulled off quite a coup with the 18NE-TV and if you want the best possible image from a flat-panel monitor you should give it a close look.

RIYAD EMERAN

A monitor that's as good to look at when it's switched off as it is when it's switched on

standard for video cards and monitors it took a lot of discussion before a digital standard could be decided on. Eventually, both monitor and graphics card manufacturers agreed on the DVI standard and we've been seeing graphics cards with both D-SUB and DVI outputs, but no digital flat panels to connect them to; until now that is.

images can appear blocky and stepped. One way that good LCD displays get around this problem is to use anti-aliasing to smooth the edges on the image.

Thankfully, the Mitac employs anti-aliasing and does it very well. That said, it's unlikely that most users will want to drop the resolution since they would

DETAILS

★★★★★



PRICE £1,643.83 (£1,399 ex VAT)

CONTACT Mitac 01952 207 201

www.mitac-europe.com

PROS First 18in DVI flat panel; fantastic picture; great design

CONS LCDs are still expensive

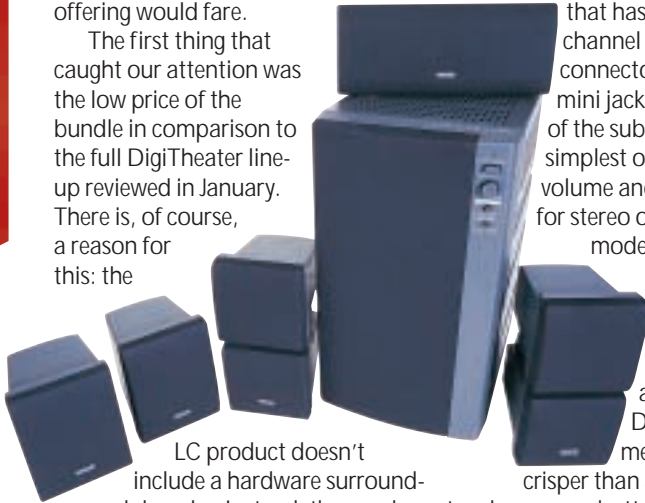
OVERALL An excellent 18in LCD flat panel with an image that's hard to beat

VideoLogic DigiTheater LC

If you have a sound card and are looking for speakers for your PC then DigiTheater LC is ideal

VideoLogic's DigiTheater amp and speaker setup was an award winner back in the January issue and has been present in our *Best Buys* line-up ever since, so we were interested to see how this new DigiTheater LC offering would fare.

The first thing that caught our attention was the low price of the bundle in comparison to the full DigiTheater line-up reviewed in January. There is, of course, a reason for this: the



LC product doesn't include a hardware surround-sound decoder. Instead, the speaker set is aimed at people who have a sound card with multiple analog outs that can

be configured to produce surround sound in analog format.

In the box you'll find two front speakers, two surround speakers, a subwoofer and a centre-channel speaker.

You also get the subwoofer amp that has analog inputs for each channel in the form of phono connectors. There's also a stereo mini jack aux input. On the front of the sub you'll find only the simplest of controls including volume and push-button switches for stereo or AC3 (Dolby Digital)

modes, and another switch for selecting either DVD or aux as the input source.

The speakers used here are exactly the same as those in the full DigiTheater setup, meaning that they sound crisper than a new 50 quid note and have more bottom end than a weight watchers self-help group. For the money, there's nothing else that comes close.

The problem, of course, is that without the surround-sound decoder, the setup is less versatile than the original bundle. Nevertheless, if you've got a multiple-out sound card and are only looking for a set of speakers for your PC, rather than a surround-sound amp, decoder and speaker combo to use with a multitude of entertainment devices, then you're on to a bit of a bargain.

NIALL MAGENNIS

DETAILS

★★★★★

PRICE £129.99 (107.24 ex VAT)

CONTACT VideoLogic 01923 277 488

www.videologic.co.uk

PROS Excellent speakers for the money; low price

CONS Not as versatile as a surround-sound amp, decoder and speaker combo

OVERALL If you've got a sound card with multiple analog outs, then this could be the speaker setup for you

Sound card head-to-head

The TerraTec DMX Xfire 1024 and VideoLogic's SonicFury slug it out to steal Creative Labs' crown

Creative Labs' Live! range of cards has been getting all the attention in the sound card market. And it's with good reason. The Live! is a fantastic product with a huge range of features. This is hardly surprising as it's really a re-engineered version of the semi-professional APS card produced by EMU Systems, which is owned by Creative.

However, both TerraTec and VideoLogic have eyes on the Creative throne and are spoiling for a fight with these two cards.

Reading the specs, the two new cards appear to be very similar. Both have a powerful onboard Digital Signal Processor (DSP) and feature A3D and EAX support for 3D sound in games. Both also have digital outs and an 8MB soundset for music.

The TerraTec's installation was straightforward. The PC recognised the DMX Xfire 1024 first time and installed the drivers and software. The card uses two IRQs: one listed under game device in the Control panel and the other listed under PCI audio accelerator.

To test out the card in analog surround mode we loaded up PowerDVD, the software DVD player, and set it to quad-speaker mode. The TerraTec performed reasonably well, but there was notable ghosting as the card tried to recreate the centre channel in software. This manifests itself as very quiet dialogue in certain parts of movies. Nevertheless, the card also has an optical output that can be used for Dolby Digital, assuming you have an external decoder.

The overall sound quality from the card's analog outputs is superb, producing crisp and clear audio with good stereo imaging. We also tried the card's onboard synth using the supplied Emagic's Logic Fun software. The General Midi (GM) sounds were very good with no obvious changes in timbre between multisampled sounds like pianos, something that can't be said for the SonicFury. The Xfire also

supports Downloadable Soundfonts (DLS), so you can get new sounds from the net.

The SonicFury's installation routine wasn't quite as smooth as that of the TerraTec. It kept insisting that the card wasn't present, even though it clearly was.

However, a quick trip to 'Add new hardware' in the Windows control panel soon sorted the problem. Nevertheless, we hope VideoLogic can sort this out in a later release of the software.

This card also uses two IRQs: one for the game device and one for the PCI audio accelerator. Again, the analog audio quality from the card was superb: clean, with good stereo imaging. However, the big selling point of the card is the analog six-channel surround-sound support, so we tested this feature using the PowerDVD software and VideoLogic's DigiTheater LC speakers (reviewed opposite).

The SonicFury features what VideoLogic calls a Versajack. This is a mini jack port on the rear of the card that can be switched in software between channels 5/6 out, digital out and aux in – quite a clever achievement. When operating in analog six-speaker mode the jack is set as channels 5 and 6.

The analog AC-3 surround sound mode produced remarkably good sound quality, probably due to the card's high-

quality digital-to-analog convertors and the powerful onboard DSP. The card can also produce Dolby Digital AC3 sound through the mini jack digital out (there's no optical out).

Unfortunately, the SonicFury's onboard synth sounds didn't fare so well. To be honest, they were horrible, sounding very cheap with a very noticeable change in timbre on multisampled sounds such as pianos.

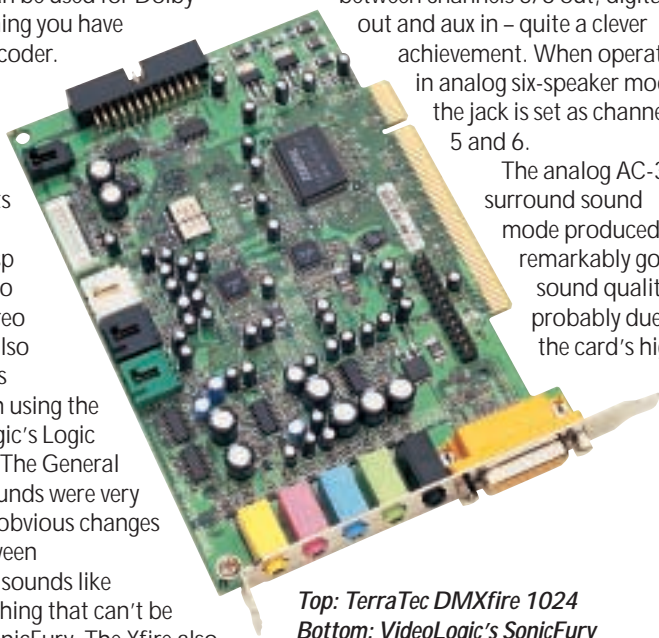
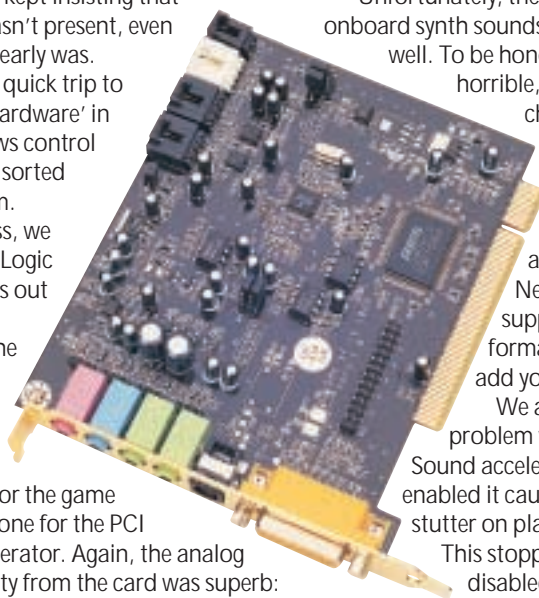
Nevertheless, it does support the DLS format, so you could add your own sounds.

We also experienced a problem with the Direct-Sound acceleration. When enabled it caused Winamp to stutter on playback of MP3s.

This stopped when we disabled this option in the card's control panel.

There's very little to separate these cards in terms of performance. What it comes down to is what you have in mind for the sound card. At the end of the day we feel the TerraTec is the better option, especially if you've already got a surround-sound decoder.

NIALL MAGENNIS



Top: TerraTec DMXfire 1024
Bottom: VideoLogic's SonicFury

DETAILS

★★★★★



TERRATEC DMX XFIRE 1024

PRICE £49 (£41.70 ex VAT)

CONTACT SCV London 020 7923 1892

www.terratec.net

PROS Great sound quality; excellent onboard synth sounds; low price

CONS Only four analog outs

OVERALL A great all-rounder for a great price

★★★★★

VIDEOLOGIC SONICFURY

PRICE £79.99 (£68.08 ex VAT)

CONTACT VideoLogic 01923 277 488

www.videologic.co.uk

PROS Six analog outs; powerful DSP

CONS Poor onboard synth sounds; some driver problems; more expensive than the DMX Xfire

OVERALL A good card, but could do with better onboard sounds and improved drivers

Encarta Deluxe 2001

The best electronic encyclopaedia around has been upgraded by Microsoft and made even better

Encarta has always been a sensible choice if you want an encyclopedia that is going to last a few years. Several of us in the PCW office are still using editions from a few years ago and having difficulty finding anything to rival what is, in effect, outdated software.

Perhaps one reason for this is the online update feature that comes as standard with the later versions. Microsoft is acknowledging that things change, even over a very short space of time, and so it is making its flagship reference product Internet aware – on a grand scale. Depending on your settings, Encarta will check whether there have been updates on every execution and integrate them into its resident database. The opening screen also includes what Microsoft is calling ‘Encarta News’ that will drag dynamic content from the Internet and embed it within the interface so that, connections permitting, every time you launch the application you’ll get an up-to-date info selection. Web integration is taken one step further through browser embedding, linking articles directly to websites and letting you perform searches from within the encyclopedia interface.

The list of Encarta editors and contributors is impressive, and it now stretches to more than 200 full-time staff in 11 countries backed up by over 1,000 contributors and consultants, and together they have added over 3,000 new articles to the existing base.

The secret of a good encyclopedia is undoubtedly an effective indexing system. It’s no good having the best content in the world if nobody can find it. Fortunately, this is another area in which Encarta excels, so if there’s an article in there that tells you what you want to know it’s almost certain you’ll find it. As well as the regular search function, you can navigate using the expanded timeline that stretches back 4.6 billion years and up to, in our copy, to 26 June 2000. This has been given an interactive slant so you can now compare specific timelines – say

the timeline of the European peoples with that of ‘Science and Technology’. Collages, meanwhile, present an interesting way of gathering related information into one area for easy access.

Encarta works well with two drives, since the actual content has been split across two discs and it’s handy to have both in at once. If that’s not an option then you can now copy the data onto your hard drive assuming, of course, you have the necessary space. The content itself is extensive enough to satisfy most people without the need to refer to further works. It seems pretty balanced, too. It

Microsoft has again provided information gathering functions geared towards completing homework and organising research. Upon installation it adds a new button to Internet Explorer, too, so you can research online content. We were surprised, though, that the fourth entry in the ‘topical information’ list when we tested it sent us to the James Bond website to offer links and video clips.

The 360-degree panoramas are still there and have been added to, and if you’re content to go on holiday with just a dozen or so foreign words under your belt then you’ll probably find good use for the language guides that teach you the numbers one to 10 and how to say thanks, your name and one or two other essentials in a couple of dozen languages.

Encarta has always been the essential reference work for anyone with a PC and it looks as though this new release is going to do nothing to harm its reputation. Microsoft’s only problem is perhaps that it is always too good, meaning you can manage with one copy for several years, which makes upgrading a less essential act.

NIK RAWLINSON



Everything you ever wanted to know about the past and were afraid to ask

has this to say, for example, about the Microsoft Antitrust case: ‘Executives from Netscape, Sun Microsystems, IBM, and several other computer software and hardware companies gave testimonies regarding their business deals with Microsoft... the judge ruled that the company had violated antitrust laws by engaging in tactics that discouraged competition. Less than two months later, in June 2000, the judge ordered the company to be broken up into two.’ From here you can link to a pretty awful picture of Bill Gates on sports-field seating.

Over 750 ‘sidebars’ have been added featuring content from *The Times* newspaper so you can see what the press was saying about historical events. This gives what could otherwise be just academic facts great flavour and a human feel.

Over 80 per cent of schools endorsed Encarta 2000, so it’s not surprising that

DETAILS

★★★★★

PRICE £69.99 (£59.57 ex VAT) (£20 cashback for Encarta 2000 Deluxe users)

CONTACT Microsoft 0345 002000


www.microsoft.com/encarta/uk

SYSTEM REQUIREMENTS 133MHz processor, 24MB of RAM for Windows 9x (32MB for WinME/NT4, 64MB for Windows 2000), 99MB of available hard drive space, four-speed CD-ROM drive, 256-colour SVGA display

PROS Internet integration; impartial accurate content; ease of use; sheer scope of subject matter tackled

CONS None to speak of

OVERALL Simply the best electronic encyclopedia you can get



Microsoft Windows ME

The latest version of the OS was worth the wait, but don't hang about too long to upgrade

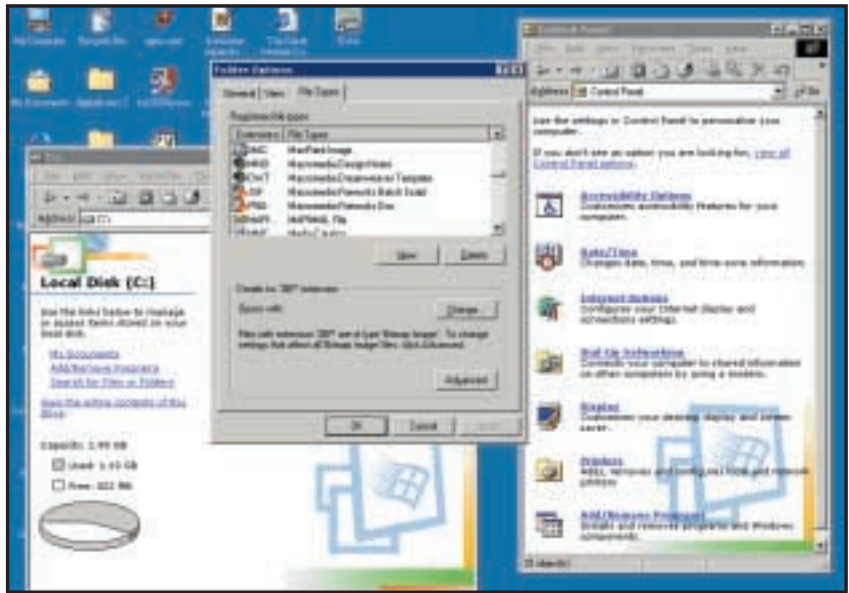
Microsoft's latest consumer edition of its Windows operating system has changed little since the late beta we last reviewed. However, this gold code release – the final, frozen code version – arrived in its retail state, which gave us the chance to try it out as an end user would. And to prove it's stable, all reviews by myself this month were written under ME.

On this occasion, installation was accompanied by a certain amount of head scratching. We were loading it onto a 933MHz Intel-based PC with 128MB of PC133 SDRAM on a VIA-based motherboard – a pretty standard spec. Our existing Windows installation was a six-week-old version of 98, so it was a fairly clean system ripe for an upgrade. On inserting the Millennium CD-ROM, Windows detected that there was a newer version available and suggested that we upgrade. One click of the OK button later and it was scanning our drives. At this point, though, it halted, warning us that the drivers it needed to update were already in use and asking us to reboot, after which it would continue.

This happened again and again and we eventually had to resort to msconfig through the Start/Run dialog box and manually deactivate most of the start-up options, effectively putting our existing Windows 98 into a 'non-safe' safe mode. It's a shame we had to resort to this. After all, it's not as though we were attempting a cross-platform installation, and Microsoft really ought to be able to selectively close down active drivers that would interfere with its installation routines without user intervention.

Your hard work is rewarded by a flash movie expounding the benefits of ME, but as it's 11MB in size and installed on your hard drive, we'd recommend wiping it once it has finished. You can find it at windows\options\install\winme.wmv. Windows also drops several cab files here, so it's likely that this new version of the OS will ask for the installation CD less often when you're installing hardware.

There are several enhancements for the more timid user. Opening your boot drive through My Computer will by default not display the contents but instead a series of links to My Documents, Add/Remove Programs and Windows Search functions, as well as an option to display the drive contents, rather like the



ME boasts an adaptive Control Panel and the View Types dialog has been improved

warning you see when opening the Windows directory (see screenshot). Control Panel is adaptive, just like the Start Menu, so only those items you use most often will be displayed, along with an option to activate the remaining entries (see screenshot).

File types are now easier to re-associate. Under Windows 9x, undoing the damage caused by an application that thought it had the right to change all your file associations so that it was the default application for displaying jpeg images could be a real headache, more so if the extension was obscure and buried deep in a list, and not in the alphabetically logical position you would expect. The View Types dialog has been improved, and can be re-ordered so they are arranged by extension or application (see screenshot). The 'As Web Page' option has also been moved out of the View menu and into Folder Options, which is far more logical.

The improved Media Player continues to impress. This can be downloaded from Microsoft's website for existing Windows users, but is bundled here. The range of skins has been increased to 12 since we reviewed the beta. By default it extracts data rather than waveforms from your audio compact discs. This puts the headphone socket on the front of your drive out of action, but does enable more than one drive for audio playback even if you have only one connected to your

sound card. We were disappointed that even the highly specified system we were using skipped several times and on several tracks while this review was being written, and paused for several seconds while accessing some websites, Microsoft's press site included.

So, now that we know the prices, it is worth the upgrade. Until Christmas at least, because until the end of December Microsoft has set the price at a very sensible £34.03 ex VAT. If you've got the money it's worth buying if you're still a 95er, although you will have to pay more than users currently running 98 or 98SE.

NIK RAWLINSON

See also the ME PC group test on page 190.

DETAILS



PRICE Upgrade from 98/98SE for £39.99 (£34.03 ex VAT) until 31 December, upgrade from 98/98SE for £79.99 (£68.08 ex VAT) after 31 December. Upgrade from Windows 95 for £79.99 (£68.08 ex VAT), full version £149.99 (£127.65 ex VAT)

CONTACT Microsoft 0345 002 000

www.microsoft.com

PROS Easier to use; media player

CONS No MS-DOS mode on Start menu or shutdown dialog; installation worries on our test system; Win 95 has a more expensive upgrade

OVERALL If you're going to upgrade, do it quickly before the price hike. If you're a novice user you should get on well with ME

SuSE Linux 6.4

A bargain OS for the Mac, but like most Linux offerings it will appeal mainly to techno-geeks

Linux on the Macintosh is a bit of a tricky proposition. The Mac is supposed to be easy to use and designed for the non-computer-geek. Linux, on the other hand, is computer-geekiness incarnate. So replacing the Mac OS with Linux kind of defeats the point of having a Mac in the first place.

Except that there are certain things the Mac operating system isn't very good at. For a start, it's not particularly stable, and it's certainly not stable enough to pass muster as a robust and reliable server platform for web or network applications.

This is where Linux has something to offer Mac users. There are several versions of Linux already available that are designed to run on the Mac's PowerPC processors, but SuSE is the first of the major Intel-based developers to bring its version of Linux to the Mac market. It's also important to remember that PowerPC versions of Linux, such as this, will also run on other computers that use PowerPC processors.

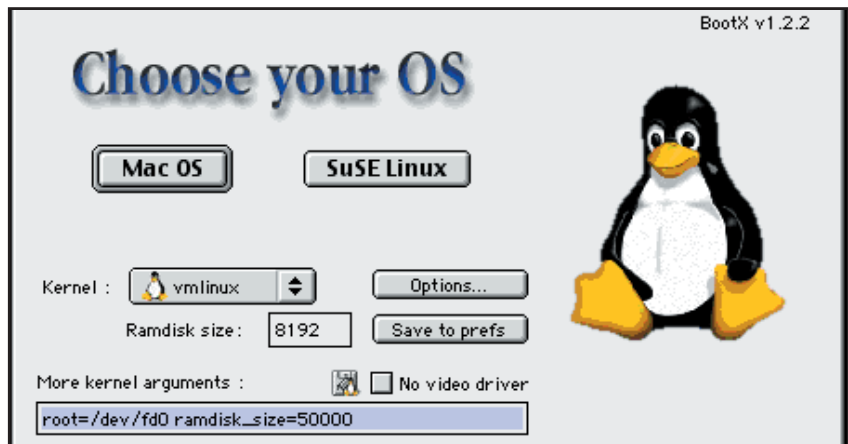
Many of IBM's server products, such as the RS/6000 and AS/4000 series, are PowerPC-based, and SuSE has recently signed a deal with IBM to provide this

Beginners will almost certainly have problems just getting SuSE Linux installed

version of Linux for a wide range of IBM products. That puts SuSE in the Linux big league, but it also means that SuSE Linux has to appeal to an unusual range of potential customers, including IBM's high-end server market as well as Apple's less technical users in the graphics, education and consumer markets.

SuSE is aware of this, and its manual does claim that its version of Linux is 'suitable for beginners as well as professionals'. However, beginners will almost certainly have problems just getting SuSE Linux installed.

The manual contains some errors – such as telling you the wrong location for the installation files – so you'll need to pay close attention to the ReadMe file on the installer CD. Unfortunately, this is rather vague so you end up switching back and forth between the manual and the ReadMe file to figure out which set of instructions to follow. Then we had



The BootX program allows you to switch your Mac between Linux and traditional Mac OS

problems with the YAST (Yet Another System Tool) installer program, which failed to recognise the Linux partitions we'd set up on our Mac's hard disk. We put in a call to SuSE's UK technical support but their initial response – 'we haven't had much practice with the PowerPC version' – wasn't encouraging. However, we did find someone who was able to help us complete the installation.

To be fair, these installation problems are common to many other versions of

SuSE provides a massive library of free Linux software for you to use, with around 1,500 programs compressed onto three CD-ROMs. There's a wide range of utilities, some halfway decent games, an MP3 player, lots of programming tools, and obscure delights such as a 'molecular graphics visualisation tool'. There's even a Mac emulator called MOL – Mac On Linux – that lets you run Mac apps at pretty good speeds. Unfortunately, installation was a struggle, thanks to SuSE's impenetrable documentation.

The huge library of software provided makes this a real bargain at just £31 but, like most versions of Linux, this is still utterly geek-bound and unlikely to appeal to the average iMac owner.

However, IBM users and Mac-based web specialists will find SuSE Linux makes a good introduction to Linux. Mind you, it might be a good idea for SuSE's technical support department to go out and buy a couple of Macs to practise on.

CLIFF JOSEPH

DETAILS

★★★★

PRICE £36.43 (£31 ex VAT)

CONTACT SuSE Linux 020 8387 4088

www.suse.co.uk

SYSTEM REQUIREMENTS IBM or Macintosh computer with PowerPC processor

PROS Good PowerPC version of Linux with impressive library of bundled software

CONS Linux virgins will find SuSE's manual utterly baffling

OVERALL A world-class Linux release for Mac and IBM users

SoftQuad XMetaL 2.0

An excellent, highly customisable XML editor to help you produce different document types

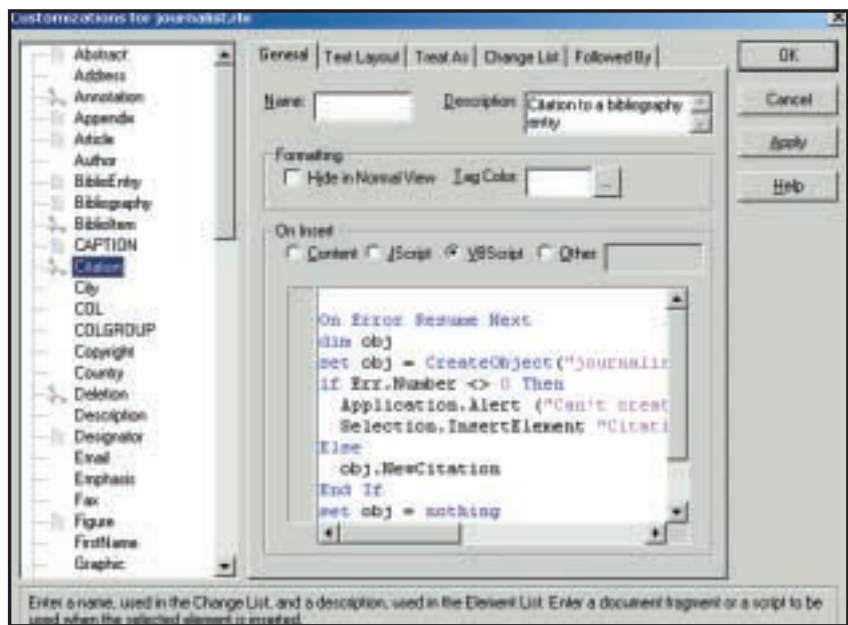
XML is one of today's buzzwords, but its impact on day-to-day work in the office has been small so far. Storing XML documents does have many advantages. It is the ideal solution when you want to produce several kinds of output from one source. For example, many organisations create both printed and online content that contain the same information but need different presentations. XML also enables programmatic access to content, blurring the distinction between the rigid structure of a database and the freeform world of non-XML documents.

Unfortunately, authoring XML is not particularly easy. You can save a Word 2000 document as XML, but this is only useful to other Office applications. The real power of XML comes from using custom tags and attributes specific to your organisation. The aim of XMetaL is to make it feasible for non-technical authors to create properly structured XML content using the DTD (Document Type Definition) of your choice. You can also use it for SGML, the more complex standard on which XML is based.

In appearance, XMetaL follows the Microsoft Office style, including a multiple document interface and Office-like icons and menu options. XMetaL documents have four views. Text view shows tags and content in the raw, with numbered lines and colour coding. Tags On view will be familiar to users of HoTMetaL, SoftQuad's HTML editor, and is a formatted view with tags showing as icons in the text. Normal view looks like a word processor document. Page preview shows the page in an embedded version of Internet Explorer. New in this version is a structure view that shows the hierarchical XML in a tree view, hot-linked to the main editor.

If you create an XMetaL document without using a template, it asks what DTD you want to use. Using the DTD, XMetaL then offers an element list and an attribute inspector to help build the document. When you insert an element, XMetaL provides dummy text that disappears when you start typing. Validation is built in, so if you make an error a validation log window pops up with details of the error.

In this default mode, XMetaL is useful but a long way from user friendly. To make it usable by non-specialists, you need to customise the package so that it



The Customization Editor is the heart of XMetaL's most powerful features

understands how to display your document type and provide sensible shortcuts. There are several techniques. First, you can use the cascading style sheet editor to match elements to styles. Second, the customisation editor is where you tell XMetaL how to handle your element types. For example, you might specify that the ListOfPetHates element is a List type.

You can also link elements to scripts that run whenever a particular element is inserted. XMetaL uses Microsoft's Scripting Host to support JScript, VBScript, or any other installed language. Third, the XMetaL interface can be customised with new icons and menu options. Fourth, it exposes a COM object model, so that internal scripts or other applications can automate its functions. You can also control other COM applications such as Microsoft Office from within this package.

Most of the new features in XMetaL 2.0 relate to customisation, including an integrated script editor, and a forms editor to create custom dialogs that support ActiveX controls. Overall, these features mean that if you do a lot of preliminary work to set up XMetaL for a particular DTD, it can be made into a productive authoring tool even for non-technical users. The work is not trivial, so it is correct to view XMetaL as a specialist application development tool rather than simply an editor. It comes with a

fully worked example loosely based on the well-known DocBook DTD, and templates for XHTML authoring in the Strict, Frameset and Transitional types.

Unfortunately this is not quite the one-stop XML solution it should be. There is no support for XML schema, a way of defining document structure that is likely to replace DTDs. Although not yet a finalised standard, XML schemas are widely used and likely to be approved soon. Another issue is that there is no built-in DTD editor. On the CD is a trial version of XML Authority, a Java application for editing both DTDs and XML schema. Bundling a demo version of a product with a very different look and feel is hardly an adequate solution.

TIM ANDERSON

DETAILS

★★★★

PRICE £352.50 (€300 ex VAT)

CONTACT SoftQuad 01727 733300.

www.softquad.com

PROS Strong validation tools; highly customisable; flexible editing views

CONS No support for XML Schema; no integrated DTD editor

OVERALL Despite its limitations, this is an excellent and highly productive XML editor, once suitably customised for a particular DTD. SoftQuad needs to integrate Schema support as soon as this is approved by the W3C

Microsoft BackOffice SBS

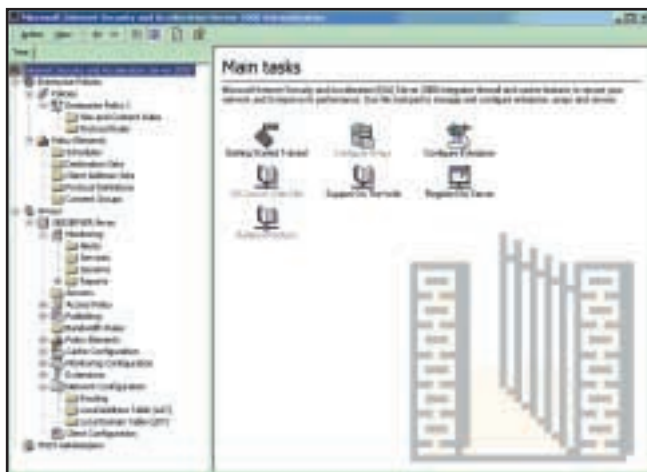
The 2000 update promises a lot, but the price may be too high if a hardware upgrade is needed

For many small businesses and workgroups with fewer than 50 clients, Microsoft BackOffice Small Business Server (SBS) isn't a bad one-stop solution. SBS provides most of the important functionality of the Microsoft BackOffice Server suite. In the previous release of SBS, you got Microsoft Windows NT Server 4.0, Exchange Server, Proxy Server, IIS and SQL Server. New features developed exclusively for SBS include modem pooling, fax sharing, the nearest thing to an automatic NT server setup seen thus far and a completely revamped administration interface that's entirely wizard-driven. Typically installed by Value Added Resellers, SBS provided a platform for delivering the usual office applications as well as common Internet access and messaging. Group faxing was another popular standard feature. SBS was sold at a knockdown price, often not for much more than an individual module. No wonder it sold well.

Following the old 'if it ain't broke, don't fix it' adage, Microsoft hopes to repeat the success it's had with SBS 4.5 with BackOffice Small Business Server 2000, which will be launched later this year, and the beta 1 version has now been released for testing.

So what's new? While the new version is heavily updated with the '2000' versions of most components, you won't find too many new features. So, you get Windows 2000 Server, Exchange 2000 Server and SQL Server 2000, all heavy-weight applications in their own right. Other improvements include an even simpler installation, an integrated management console and the latest Windows 2000 applications. The biggest changes are to Proxy Server, which is not version 3.0 but now called Internet Security and Acceleration Server 2000. It's still a proxy server but it now has proper firewall provision and you can control user access to the Internet.

We installed the beta 1 on a Panrix dual-700MHz Pentium III SB Server, with 512MB of RAM and an 18GB Ultra2 SCSI hard disk. Installation was pretty simple but it was a lengthy affair and you should allow at least a couple of hours to perform a clean install. The integrated setup enabled us to complete the install in a single process using default settings, minimising the number of dialog screens



Installation is a fairly easy, if lengthy, process using default settings

needed and greatly reducing the complexity of the whole process.

You can also upgrade an existing SBS installation: Microsoft gives a 'guarantee of technical compatibility' but, despite this reassurance, we're not sure we'd be keen to upgrade a server that is probably mission critical to a small business. Where there are fundamental changes to the OS involved we prefer the safety of a clean install. The downside, if it goes wrong, isn't so daunting. There's another reason, too: hardware. SBS 2000 is hardware hungry and requires a minimum of a 300MHz Pentium II processor, 256MB of RAM and a 4GB hard disk. For better performance and redundancy, Microsoft recommends 512MB of RAM and two mirrored 8GB hard drives, a specification that may be larger than your current server. The odds are that small businesses must be prepared to spend money on hardware upgrades in order to satisfy SBS 2000.

After installation, a To Do List window guides you through the required post-configuration chores of adding users, setting up client workstations and the like. Going through the steps launches the wizards used to set up Internet connectivity, add user accounts and licensing and set up client PCs. The use of wizards is almost essential as they simplify some otherwise mind-boggling tasks, such as adding new users to an Active Directory, a skill that is probably beyond most network administrators, let alone a small company's 'IT guy'. SBS 2000 allows a maximum of 50 concurrent connections and can be installed only on the network as the root

Domain Controller of a new forest, with no trust relationship with other domains or other Active Directory forests.

While it was reasonably integrated, the previous version of SBS was little more than a group of Back Office products loosely glued together by a rather kludgy

management console. Management is much improved in the new version because it is based on Microsoft Management Console snap-ins. These make it easy to adjust the configuration of the finest detail from a single location. For example, the Health Monitor snap-in lets you, err... monitor the health of the server. There's an ocean of settings to tweak here but you can reduce these by preparing a 'Favourites' list. Remote administration is possible via Windows Terminal Services.

UK pricing hasn't been set but it's likely to be much the same as for the previous version – the five-user licence sold for £1,080 ex VAT. Existing SBS users can upgrade for free if they purchased after 1 January this year. Others will be able to upgrade for a nominal charge.

ROGER GANN

DETAILS
 ★★★★★
PRICE £TBA
CONTACT Microsoft 0345 002 000
www.microsoft.com
PROS A lot of bang per buck; simple installation and management
CONS Hardware hungry; may be too powerful for some small businesses
OVERALL The first beta release of Small Business Server 2000 shows significant improvements over its predecessor, Version 4.5 for Windows NT, including simplified installation, an integrated management console and the latest Windows 2000 applications. But it's a complex confection that needs suitably beefy hardware to run on

Power Translator Pro 7.0

While it may stumble over the classics, it does provide a good starting point, especially for websites

L&H's package translates foreign text into English or English into a foreign language, such as French, German, Spanish, Italian, Portuguese and Japanese, and it uses specialist dictionaries for business, computer, legal and medical texts.

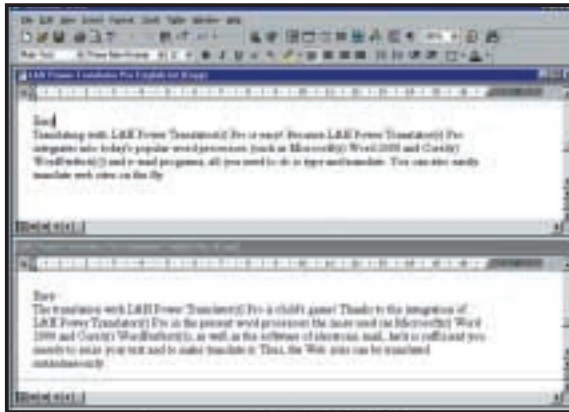
Computer translations should only be considered a first draft – while you can knock them into good English, it's not comfortable to read in its raw state.

We took the text of L&H's own press release for the product, downloaded from its website in English and French. The results were understandable, but there were blunders (see screenshot).

The new release can translate foreign websites on the fly, leaving formatting intact in Explorer or Navigator. It's also easy to use in Word or WordPerfect as it integrates with either, offering an extra Translate menu and translating selected text or whole documents.

If you use Power Translator Pro 7.0 to translate away from English, it might need the same massaging to produce colloquial

The top text is the English version and the bottom pane shows the same section, computer translated from the French text



phrases, as translated English output does. And if you're relying on computer translation, it's likely to be because you're not fluent in the language. Can you risk the sillies that might result on an important document?

SIMON WILLIAMS

DETAILS

★★★★

PRICE £99.99 (€85.10 ex VAT)

CONTACT L&H (Lernout & Hauspie)

0800 056 0539 www.lhsl.com

SYSTEM REQUIREMENTS Pentium II 233, 64MB of RAM, Windows 95/98/2000, 130MB of disk space, plus 15-100MB per language pair

PROS Six languages supported. Well integrated with word processors and browsers
CONS Translations need 'tidying up'; idioms not well handled

OVERALL While the software works hard, it only makes 'first draft' translations. Even so, it speeds translation work considerably and could save a lot of money in the long term

Readiris Pro 6.0

If you need an OCR, this one offers a high degree of accuracy

Readiris is one of the better-known OCR (optical character recognition) programs, partly because IRIS has deals with Hewlett-Packard, Agfa and others to bundle the entry-level version with their scanners and multifunction machines. You may already know the basic program, but the full version – Readiris Pro 6.0 – is bigger and better in nearly all respects.

A wizard helps set the software for your scanning device and select the target application for output. The program can feed the text it processes into newer versions of Word and Excel and into older ones with the aid of macro scripts. A wide range of other applications is supported, too, going back to DisplayWrite and MultiMate.

As with most modern OCR packages, Readiris offers to maintain the layout of the original as it's scanned. It does this extremely well, recognising areas of text and graphics and even recreating tabular information in Word tables.

The software can read colour

originals and will include colour graphics in recognised pages. If your scanner has a feeder it will OCR multi-page documents automatically.

Readiris Pro 6.0 does a pretty good job of recognising text. Regular fonts cause it no problem and pages often come through word perfect. If you want to recognise text in headers and footers or in fancy fonts, things become a bit more hit and miss. However, the program's learning mode, where it makes guesses and you confirm or refute each one, improves its accuracy further.

The new version reads foreign texts. It supports 56 different languages, including those that don't use the Roman alphabet and, if you want to install them, Chinese and Japanese. You'll need suitable foreign language fonts, and foreign language versions of Windows too.

Readiris Pro 6.0 offers professional OCR at a very realistic price and will upgrade from virtually any TWAIN-compatible scanning device.

SIMON WILLIAMS



Bigger and better than its predecessor

DETAILS

★★★★★

PRICE £93 (€79 ex VAT)

CONTACT Transform 01959 578300

Prestige Networks 01635 866888

www.irislink.com

SYSTEM REQUIREMENTS Pentium, 32MB of RAM (we'd recommend Celeron 500 and 64MB), Win 95/98/2000, 35MB of hard disk space

PROS Supports 56 languages; high OCR accuracy; good layout maintenance

CONS For best results, it needs some teaching
OVERALL One of the top OCR programs for the PC. It's a great upgrade to the light version, but is just as valuable when bought from cold

McAfee Firewall 2.1

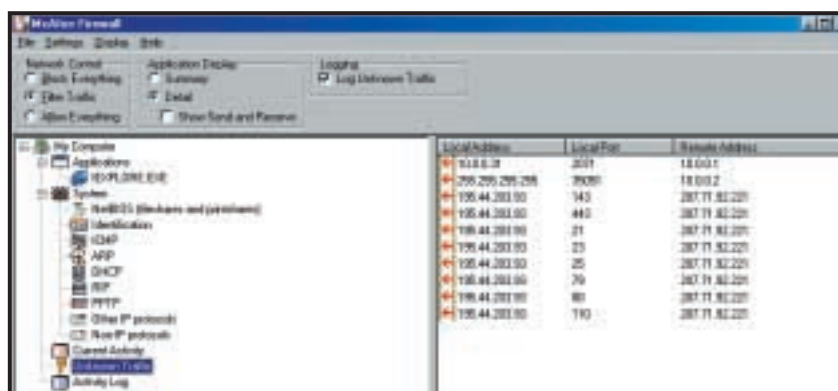
Despite its antique interface, it is an effective firewall, although the uninitiated should beware

While most large corporate networks shelter behind sophisticated firewalls, many systems used in homes or small sites are left open to security breaches. Several software vendors have rolled out low-end firewall packages and the latest to hit these shores is McAfee Firewall. Back in February, the company bought Signal9 and renamed its ConSeal Private Desktop product McAfee Firewall. It's a relatively simple, effective firewall for broadband users and anyone who already has an anti-virus program. It executes its duties but lacks some of the anti-virus, confidential data protection and content filtering found in rival products. It runs under Windows 9x and NT4.

Firewall installs very simply, insisting on a reboot to clear the decks before getting down to business. Curiously it isn't automatically started when you launch Windows, though this is a simple configuration option. First impressions are disappointing. McAfee hasn't overhauled the rather unsophisticated Windows 3.1-ish interface and the online help system ought to be pensioned off.

Firewall's strength lies in the fact that it catches communications early on in the chain, at the low NDIS (Network Device Interface Specification) layer, ie below the operating system. It filters both inbound and outbound traffic at this level, which protects the system before malicious code gets to the OS. As a result it can block transmissions of Address Resolution Protocol, IPX/SPX and NetBEUI (not just TCP/IP), but granular filtering is not available for IPX/SPX or NetBEUI. It also permits separate configurations for multiple network adaptors – local or dial-up.

Because it is so configurable, it's a very powerful tool. To manage the firewall at the port level, you use the System Settings Properties dialog. Here



After installation NetBIOS was left wide open, however this was solved following a reboot

you can change the settings for services such as point-to-point tunnelling protocol, address-resolution protocol and dynamic host-control protocol.

In default mode, it works in a similar way to ZoneAlarm in that you have to authorise programs that wish to access the Internet. So the first time you use Internet Explorer, it presses the 'pause' button while it asks you if it's OK to let Internet Explorer 'communicate', ie access the Internet. If you permit this, it becomes a trusted application, otherwise, it is blocked. So, if one of your other applications tries to access the Internet through your browser, it's a good indication that a Trojan horse virus is attempting to steal information. This isn't a bad way of working but there are some flaws. For a start it tells you the file name rather than the name of the program, no problem with iexplore.exe but how many of you know that Outlook Express is msimn.exe? The other problem is that your choices are narrow – it's either Trust or Block.

One feature that is absent is the simple facility to trust specific machines by IP address. This allows the user to establish safe 'trans-Internet' connections to machines belonging to

friends, family, co-workers or the machine at the office.

Firewall's performance when confronted by the Ports Probe at grc.com was good – all the ports tested were 'closed' (ie their existence was acknowledged) or 'stealth' (ie no response to the probe was made), but the first time we ran the test after installing it, Port 139, NetBIOS was left wide open, possibly the most insecure port there is (see screenshot). But after a reboot, it was nailed down and resisted probing. Firewall is a good solution for network savvy users but for others it's a little daunting.

ROGER GANN

DETAILS

★★★★

PRICE £29.95 (£25.49 ex VAT)

CONTACT McAfee 00 31 20 586 6100

<http://software.mcafee.com>

SYSTEM REQUIREMENTS 486 or higher, Win9x or NT, 16MB of RAM, CD-ROM, Internet connection

PROS Offers effective firewall protection

CONS User unfriendly; antique interface; tricky to configure

OVERALL Not really for the uninitiated

Axis 2100 network camera

A serious business tool that can help with surveillance without using a PC

This is more than a network camera – it's a Linux-based web server as well, one dedicated to delivering video images across an intranet or to a website. It can connect directly either to a network or deliver images via a dial-up connection/modem without having to connect directly to a computer.

Although it resembles a large webcam, this is a more serious corporate tool that lends itself to specialist tasks such as security or surveillance. It doesn't need to be hooked up to a PC, so it can be moved around, plugged into any convenient network socket or, with the aid of a modem, a phone socket.

A serial lead is supplied (so that you can use Telnet to configure it), as well as a stand and a power supply. At the rear are a DB-9 serial port, a 10/100Mbps/sec Ethernet port, an I/O port (to which you can hook up things like alarms, switches or relays) and a

power socket. The lens uses a standard video CS mount, so it's easy to swap.

Installing it on a network is easy. Allocating an IP address is done by using

either the IPInstaller (downloadable from Axis' website) or the standard ARP utility. Once

set, you can enter that IP address in your browser to view the images and settings, although if you use Internet Explorer you'll need to install an ActiveX control first.

Images are stored as jpegs and can be delivered in a number of ways, including ftp, email and directly via a dial-up net connection

using a modem. It works with Windows, MacOS and Linux.

The images are better than average



for a web camera. It's fast too and can compress 10 640 x 480 images per second, each about 13KB in size. It can serve about 10 viewers at once.

The Axis 2100 is easy to set up, flexible and you can install a dozen of them on a network without drowning it in video traffic. Last but not least, picture quality is good and it can work in low light conditions.

ROGER GANN

DETAILS

★★★★★

PRICE £373.65 (£318 ex VAT)

CONTACT Axis Communications
020 7553 9200

www.axis.com

PROS Easy to set up; good image quality; convenient

CONS No way of remotely running or tilting the lens

OVERALL An affordable, easy-to-set-up network camera, and good picture quality too

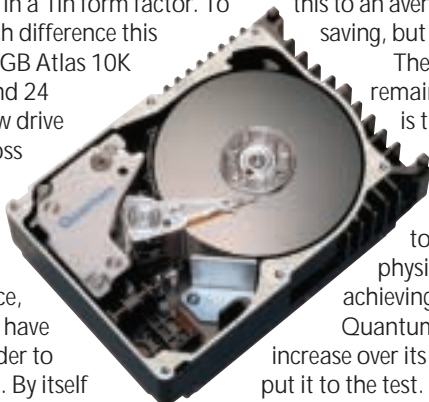
Quantum Atlas10K II

An older drive technology brought up to date, proving there's still a lot of life left in 10K disks

Instead of following Seagate into the 15,000rpm (15K) drive market (*PCW* October 2000), Quantum has stayed with the tried and tested 10,000rpm (10K) technology with the Atlas 10K II.

We tested the 9.2GB drive, although the range extends up to 73.4GB. Quantum has pushed the areal density to 7.7GB/sq in, so all the drives except the 73.4GB come in a 1in form factor. To indicate how much difference this makes, the old 36GB Atlas 10K had 12 platters and 24 heads, but the new drive manages this across five platters and 10 heads.

Higher areal density creates better performance, as the drive heads have to move less in order to write or read data. By itself this isn't enough to bring a real gain in performance, so Quantum has taken a good look at the rest of the drive.



A big problem with the original was the 2MB cache, which clearly wasn't enough on an enterprise drive. The 10K II resolves this by upgrading to 8MB.

This still left one problem. The slowest part of any hard drive is the time it takes to find an area of the disk to read or write data. The original Atlas 10K has a seek time of 5ms, but Quantum has decreased this to an average 4.7ms – not a big saving, but every little helps.

The only technology remaining from the first drive is the Ultra160 SCSI interface. While this increases the bandwidth of the interface to 160Mbps/sec, the physical drive is incapable of achieving these rates.

Quantum quotes a 15 per cent increase over its previous drive, so we put it to the test. Using a 1GB sequential file copy, and Intel's Iometer version 1998.10.08 for a random read/write test, the 10K II copied the file in 42

seconds, compared to the 48 seconds of the Atlas 10K. The random read/write test gave a result of 1.42Mbytes/sec against the 1.2Mbytes/sec of the original Atlas 10K.

Quantum hasn't gone for an all-out revamp, but has refined the technology, and the results are impressive. With capacities reaching the 73GB point, this proves that 10K drives still have a lot to offer before 15K drives kill them off.

DAVID LUDLOW

DETAILS

★★★★★

PRICE £364.25 (£310 ex VAT)

CONTACT Quantum 01344 353 5000

www.quantum.com

PROS Fast; high capacities

CONS A basic revamp of the old model

OVERALL 10K drives still have a lot of life left in them, especially when you need large capacities. Quantum has done a good job of revamping the Atlas 10K



PERSONAL COMPUTER WORLD

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ENTRY-LEVEL PC

Atlas
Meridian A750T



Based on AMD's Socket A 750MHz processor, an MSI K7T Pro motherboard and 128MB of PC133 memory, this machine makes use of the latest technology. You get a 20.5GB IBM hard drive and a 32MB Hercules 3D Prophet DDR-DVI. Bonuses are the 17in CTX Trinitron monitor, eight-speed DVD and Mitsumi CD-RW. A killer price for a killer system.

Review August 2000, p78 Price £1,173.83 (£999 ex VAT)
Contact Atlas 07000 285 275 www.atlaspc.com

MID-RANGE PC

Mesh
Matrix 850T



At the heart of the system beats AMD's Athlon 850MHz with on-die cache. You also get 128MB of PC100 memory and a large 30.7GB Maxtor DiamondMax hard drive. The excellent Hercules 3D Prophet II graphics card drives a 19in Mitsubishi Diamond Plus 91. Mesh has produced a fantastic package for any user after the latest technology at a bargain price.

Review August 2000, p76 Price £1,761.32 (£1,499 ex VAT)
Contact Mesh 020 8208 4706 www.meshcomputers.com

HIGH-END PC

Mesh
Matrix 1.1 GT Pro



Making good use of AMD's 1.1GHz Athlon, which has 256KB of on-die Level 2 cache, this PC means business. It's based on an Asus A7V-100 motherboard with a Promise PCI-ATA100 controller that really helps it to fly. There's also a 64MB GeForce2 GTS graphics card, 256MB of RAM, DVD and CD-RW drives, a Creative Sound-Blaster Live! 1024 and a 19in Taxan monitor.

Review October 2000, p73 Price £2,348.83 (£1,999 ex VAT)
Contact Mesh 020 8208 4706 www.meshcomputers.com

FULLY-FEATURED NOTEBOOK

IBM
Thinkpad A20P



This well-built notebook exudes quality. The Thinkpad has a mobile Pentium III 700MHz, 128MB of RAM, 16MB ATI mobility M3 graphics, 18GB hard drive, DVD, floppy and all the ports you need except FireWire. IBM's Ultrabay 2000 allows you to swap the DVD for optional extras, and the 1,400 x 1,050 TFT is a shining example of a 15in screen.

Review November 2000, p93 Price £2,888.15 (£2,458 ex VAT)
Contact IBM 0870 010 2512 www.pc.ibm.com/buydirect

ULTRA-PORTABLE NOTEBOOK

Sony
Vaio PCG-Z600NE



The Z600NE has taken everything that was good about the original and made it that little bit better. It is built around a 650MHz Pentium III SpeedStep processor, which drops the speed and voltage of the CPU in order to preserve battery power. With 128MB of RAM, a 12GB hard disk, IrDA, a modem and a FireWire socket, the Vaio is both versatile and ultra-portable.

Review October 2000, p79 Price £2,399 (£2,042 ex VAT)
Contact Sony 08705 424 424 www.sony.co.uk

PDA

Ericsson
MC218



Based on the Psion Series 5mx, the MC218 has 16MB of memory and a processor speed of 37MHz. The email software is built into the ROM and supports UUEncoded attachments and MIME. Frames and Java 1.1.4 are supported by the web browser. Ericsson has even bundled an IrDA modem for connecting the device to its range of mobile phones.

Review May 2000, p204 Price £379 (£322 ex VAT)
Contact Ericsson 0990 237 237 www.ericsson.com

DIGITAL CAMERA
Sony
Cyber-shot DSC-S70

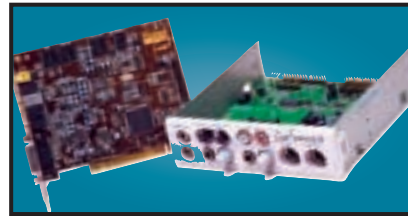

Sony's S70 uses the latest battery technology to provide around 120-150 minutes of usage and is Sony's first genuine 3.3megapixel camera. Image quality is superb. All in all, the S70 is the best all-round 3.3megapixel camera out there.

Review August 2000, p97 **Price** £750 (£638.30 ex VAT)
Contact Sony 0990 111 999 www.sony.co.uk

WEBCAM
Creative
WebCam Go Plus


With 8MB of memory and a built-in mic, the WebCam Go can also be used as a low-res handheld snapper or video camera. With excellent image quality and software you can snap up to 150 pictures in 32bit colour.

Review October 2000, p96 **Price** £129 (£109.79 ex VAT)
Contact Creative www.europe.creative.com

SOUND CARD
Creative Labs
SB Live! Platinum


This is exactly what gamers and budding PC musicians have been asking for – great sound quality and excellent bundled software make it a winner. We think it's the best sound product ever.

Review February 2000, p83 **Price** £179 (£152 ex VAT)
Contact Creative Labs 0800 973 069 www.soundblaster.com

COLOUR INKJET
Hewlett-Packard
DeskJet 930C


This uses the same engine as the higher spec P1100 and is a breeze to setup. Connection is via the parallel or USB interface and drivers allow you to adjust the printed page drying time.

Review July 2000, p201 **Price** £130.43 (£111 ex VAT)
Contact HP 0990 47 47 47 www.europe.hp.com

BUDGET LASER PRINTER
Kyocera
FS-1000


This printer is driven by a 75MHz PowerPC processor, comes with a standard 4MB of RAM and can print up to 1,200dpi. It also has an environmentally friendly re-usable toner drum.

Review October 2000, p110 **Price** £329 (£280 ex VAT)
Contact Kyocera 0118 931 1500 www.kyocera.co.uk

COLOUR PHOTO PRINTER
Epson
Stylus Photo 870


Aimed at the professional imaging user, our test photo was beautifully rendered, there was no evidence of undesirable banding and skin tones were accurately reproduced.

Review July 2000, p206 **Price** £207.98 (£177 ex VAT)
Contact Simply 020 8523 4020 www.simply.co.uk

BUSINESS LASER PRINTER
Hewlett-Packard
LaserJet 4050TN

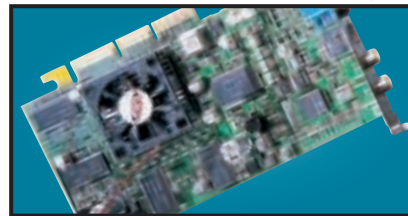

The 4050TN's 1,200dpi resolution is outstanding, and with a 133MHz NEC processor and 16MB of RAM it can turn out 16ppm. It also comes network-ready as standard.

Review September 1999, p96 **Price** £1,580.38 (£1,345 ex VAT)
Contact HP 0990 474747 www.europe.hp.com

MULTI-FUNCTION DEVICE
Hewlett-Packard
Office Jet G85


A scanner, photocopier and colour printer in one, that produces vibrant colours and realistic skin tones. Well suited to home or office work – and it's keenly priced.

Review September 2000, p112 **Price** £599.25 (£510 ex VAT)
Contact HP 0990 474747 www.europe.hp.com

GRAPHICS CARD
ATI
Radeon


With an integrated Transform and Lighting engine, the Radeon also supports hardware environment bump mapping for lifelike surfaces and its 32bit performance is second to none.

Review October 2000, p199 **Price** £299 (£254.46 ex VAT)
Contact ATI 01628 533 115 www.ati.com

EXTERNAL STORAGE
LaCie
PocketDrive


This tiny external 6GB hard drive has two FireWire ports and a single USB connector. The FireWire ports mean the drive can be daisy chained to other FireWire peripherals.

Review July 2000, p108 **Price** £351.33 (£299 ex VAT)
Contact LaCie 020 7872 8000 www.elacie.com

EIDE HARD DRIVE
IBM
Deskstar 75GXP

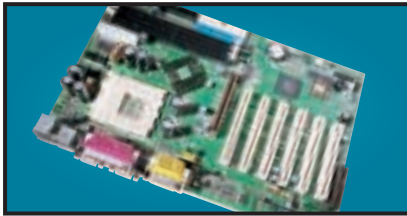

A 75GB drive with an areal density of 11GB/sq in. It has a spindle speed of 7,200rpm, a 2MB data buffer and an average seek time of 8.5ms. A lot of storage for the money.

Review September 2000, p109 **Price** £430.05 (£366 ex VAT)
Contact dabs.com 020 8523 4020 www.dabs.com

SCSI HARD DRIVE
Quantum
Atlas V


Increased areal density makes this 36GB drive impressive. It may not be as fast as 10,000rpm drives, but with seek times around 6.3ms and a spin rate of 7,200rpm, it's good value.

Review July 2000, p100 **Price** £399.50 (£340 ex VAT)
Contact Quantum 01344 353 500 www.quantum.com

SOCKET A MOTHERBOARD**MSI
K7T Pro**

An AMD Athlon/Duron motherboard that uses VIA's KT133 chipset and has AGP 4x, ACPI, integrated AC97 audio support, five PCI slots, plus one shared with a CNR. It's simple to set up and with a 200MHz FSB is fast too.

Review November 2000, p226 Price £98.70 (£84 ex VAT)
Contact MICROteq 01733 896 667 www.mstcomputer.com

FC-PGA MOTHERBOARD**Asus
CUSL2****new**

A well laid out 815E motherboard that sports six PCI slots, two CNR slots and an AGP Pro slot. The documentation is first rate and the board is simple to set up. Quite expensive, but certainly worth the money.

Review November 2000, p219 Price £136.30 (£116 ex VAT)
Contact dabs.com 0800 138 5204 www.asus.com

PROJECTOR**InFocus
LP335**

A fantastic unit that uses the latest DLP chip. It even allows you to view slides with the lights on. It is expensive, but if you need something this small and light then the LP335 gives an extremely sharp, crisp image.

Review August 2000, p118 Price £4,876.23 (£4,150 ex VAT)
Contact InFocus 0800 028 6470 www.infocus.com

17IN MONITOR**Iiyama
VisionMaster Pro 410****new**

This monitor has excellent image quality and vibrant colours. With resolutions on the Natural Flat aperture-grille tube up to 1,600 x 1,200 at 75Hz this unit is an ideal 17in solution.

Review September 2000, p192 Price £276.12 (£235 ex VAT)
Contact Iiyama 01438 314 417 www.iiyama.co.uk

19IN MONITOR**CTX
PR960F**

Equipped with an FD Trinitron tube this has a constant 0.24mm pitch across the screen. It also has an additional BNC input and a built-in USB hub as standard.

Review June 2000, p91 Price £374.83 (£319 ex VAT)
Contact dabs.com 0800 138 5240 www.dabs.com

21IN MONITOR**Sony
Multiscan G500**

The name Sony is synonymous with high-quality displays and this 21in FD Trinitron monitor is no exception. It has dual-input connectors and remains crisp even up to 1,800 x 1,440 at 75Hz.

Review May 2000, p226 Price £911 (£775 ex VAT)
Contact Sony 0990 424 424 www.sony-cp.com

LCD MONITOR**Mitac
18NE-TV****new**

This 18in display has a native resolution of 1,280 x 1,024 and it only has a DVI connector. When connected to an appropriate graphics card, this will ensure a perfectly sized picture.

Review November 2000, p121 Price £1,643.83 (£1,399 ex VAT)
Contact Mitac 01952 207 300 www.mitac-europe.com

REMOVABLE STORAGE**Panasonic
LF-D201 DVD-RAM**

With a disc capacity of 4.7GB per side, compatibility with existing 2.6GB and new 4.7GB per side discs, and a versatile software bundle, this is a great product for storing large amounts of data.

Review October 2000, p98 Price £374.82 (£319 ex VAT)
Contact Panasonic 0845 600 3535 www.panasonic.co.uk

CD-RW**Creative CD-RW Blaster
CD-Studio**

This 8 x 4 x 32 EIDE CDRW package has everything you need to get started. Not only is there an EIDE cable and screws to mount the drive, but also a CD-RW disc and 10 CD-R discs.

Review June 2000, p192 Price £141 (£120 ex VAT)
Contact dabs.com 0800 138 5114 www.europe.creative.com

ISDN TA**Eicon
DIVA USB**

Weighing in at 70g and no larger than a mouse, this USB ISDN TA opens up 128Kbits/sec bandwidth and supports G3 and G4 faxing as well as a variety of voicemail and file transfer facilities.

Review March 2000, p87 Price £104.57 (£89 ex VAT)
Contact Eicon Technology 020 8967 8000 www.eicon.com

BACKUP**OnStream
SC30**

The SC30 has a 30GB compressed data capacity and using Backup Exec it achieved over 70Mbytes/min. Echo software provides drive-letter access so you can treat it like a hard drive.

Review September 1999, p102 Price £363.07 (£309 ex VAT)
Contact Simply 020 8523 4020 www.onstream.com

DVD DRIVE**AOpen
DVD 1640 Pro**

An impressive 16-speed DVD reader that includes Cyberlink's Power DVD movie player. A first-class unit that marries excellent performance with solid build quality.

Review August 2000, p196 Price £141.58 (£120.49 ex VAT)
Contact Jungle.com 0800 0355 355 www.aopen.nl



Designs on websites

ILLUSTRATION PATRICK MORGAN

CREATING A WEBSITE SOUNDS SIMPLE, ESPECIALLY WITH ALL THAT SOFTWARE TO HELP, BUT IT'S EASY TO MISS THE OBVIOUS. NIGEL WHITFIELD LEADS YOU THROUGH THE MINEFIELD OF WEBSITE DESIGN

ABOUT US

WHAAM!

23
seconds

.LOAD.. 90AP b-PROCESSING.. DOWN C U U U

D I N G O O O

An indecent number of websites have eye-searing colours, unreadable text, and impenetrable navigation. Someone – possibly the designer’s mother – loves those websites, but few other people do.

Frankly, if a website doesn’t look good, it’s not going to get many visitors. While that may not be a problem for a small home page, if you’re trying to run a business or provide a useful service, then you’ll want to make sure that your website is not so hideous as to cause people to turn away.

Of course, there are no hard and fast rules about what constitutes a good site. As with anything that involves being creative, there’s plenty of room for personal opinion and expression. However, there are some things that simply just don’t work, or make it harder for people to reach the information they want – so it’s those issues that we’ll be looking at in this article, explaining different ways you can achieve a better result.

There are plenty of things you can get wrong

on a website, ranging from the seemingly obvious to the obscure, so let’s look at some of the things you should be thinking about when you sit down to plan your site.

You did plan it, didn’t you? While you might feel that the best bet for a personal home page is to grow ‘organically’ – with links to new pages being added where they seem most appropriate at the time, sooner or later it’s going to become confusing working out how to get from one page to another.

For a business site, organic growth is likely to be a recipe for website disaster. Instead, you really do need to plan how your site is going to work before you delve into your web design package. Will there be a shop? Are there separate areas needed for products or lines of business? Which areas should be linked to each other? If you have products, for example, there probably ought to be a link from the page for a particular product to the page where people can find support information, and perhaps to your price list.

In short, you need to think about the different people who are using your site, and how

Taking the easy route?



Looking at our suggested sites on the following pages, you might be forgiven for thinking we'd make you throw away your whole site and start again. Don't let us put you off too much – there are plenty of ways to create a good-looking site without much trouble.

One of the most effective ways to come up with something that works well is to use a web-design package that allows you to use templates and comes with a wide selection of ready-made items for you to use. For example, many packages have a selection of buttons you can use to provide navigation facilities on your website. Some even have a set of pages that you just need to edit and fill in the details of your company or family.

If you do go down this route, make sure you check the finished result carefully – you don't want to end up with one of the less

obvious pages on your site having a section that says 'Fill in your company's phone number here'. And, of course, think carefully about which template you choose. You're effectively handing a large part of the design of your site over to someone else, so make sure you've made the right decision.

One suitable approach for structured sites is to use a program like NetObjects Fusion. Once you've created the layout of your site in a family-tree-style diagram, you can edit each page, and Fusion will take care of the work of creating the links between different pages. It even generates buttons for you, with the appropriate labels, according to the style sheet you've selected. If you want a different look for the site, all you have to do is pick a new style sheet, and all the buttons, banners and so on are automatically rebuilt for you.

A final alternative, if you don't want the rigid controls imposed by a package like Fusion, is to create your own templates in a package like Dreamweaver. This approach ensures that all your pages have a consistent look and feel, helping people find their way around the site, and you'll only have to create the basic layout once for each type of page.

Templates and libraries, which could also include ActiveX or Java objects, certainly speed up the development of your site, and they can go a long way towards solving some design problems. But like anything, remember that they're a guide, nothing more. You may have a CD or a link to a site packed with applets designed to help move around your site, but by using them or just choosing the wrong one, you can still undo a lot of the hard work you've put into the rest of your pages.

they're likely to move through it. When you've done that, you'll have a better idea about how everything links together. Even if the package you're using to design the site doesn't do it for you, creating a tree layout of your site is probably a good idea. If you find that there are lots of links from one branch of the tree to another, it might indicate that you need to think again about what information goes where.

Another thing to think about is how people are going to navigate around your site. You might want a button bar, for example – and some packages, like NetObjects Fusion, will create one for you. But which sections should be on the bar? And should it be the same button bar in all the areas of the site, or do you need a different one depending on where people are?

Make the button bar too complicated, and people will just find it irritating or confusing – not to mention taking up plenty of space on the screen. You might decide to use a Java applet to provide navigation – one popular applet presents your site in a tree view, so people can go directly to the page that they want.

It's a nice idea – but don't rely on it. Some people might not have Java enabled on their browser, and if there's no other way to move

around, they'll be stuck on your home page with nowhere else to go.

Compatibility issues

Talk of Java leads naturally on to compatibility. In the good old days, the web was the web, and most pages would work on most computers. Sadly, that's no longer the case – and you can't even rely on companies like Microsoft to display pages the same way on both PC and Mac systems.

Even using 'cross-platform' tools like Java, it's still possible to completely mess things up. One well-known UK bank, for example, has an Internet banking service that requires both Windows and Internet Explorer. The bank seems to have completely missed the point of writing its system in Java.

If you're going to rely on such tools to make your website work, then you should make sure that they're at least cross-platform and that you provide a way for someone to find out at least basic information from the website without having to reconfigure their web browser.

The same is true of JavaScript and plug-ins. OK, so you might have created something that looks really stunning in Shockwave, but if your whole website relies on it for navigation, then you

Scanning your image to the right resolution



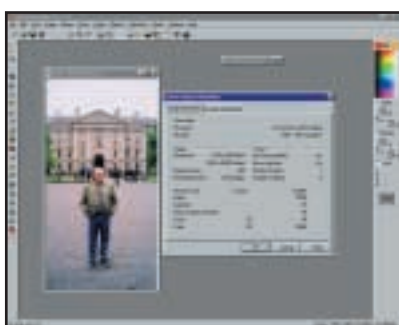
One of the biggest causes of web design problems is poorly scanned pictures, causing lengthy downloads or messing up your page design. Rather than preview pictures in your web design program, where they may be scaled automatically, drag the icon from the desktop into an open browser window, and you'll see what size the image really is. Here it's a comfortable size for viewing on most PCs, but it didn't start that way!



1 Problems often start when an image is scanned at the wrong resolution. PC screens are around 96 dots per inch (dpi), while the Mac is 72dpi. Either is a reasonable choice – don't just accept the default on your scanner, which could be 300dpi or higher. That could result in files 16 times larger than they need to be.



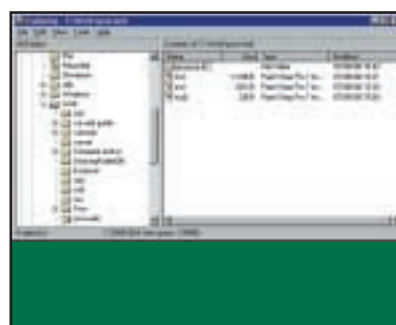
2 This is the result of scanning our picture with the defaults. As you can see, dragging it into the browser reveals how oversized it is. Scaling the picture on your web page, using either a pixel or a percentage size, will just result in a much bigger download for visitors to your site. Instead, we need to resample the image to change both its resolution and size.



3 In PaintShop Pro 7, the Image Info option will tell you the resolution of the image – though some formats, such as gif, might produce misleading information. The jpeg above was scanned at 300dpi. Although the image size says that it measures 3in, remember that when it's displayed on a 96dpi screen, it'll be more than three times that size.



4 The Image Resize option lets you fix your image so that it's suitable for the web. Click to select the Actual size option, and change the resolution to either 72 or 96 pixels per inch (ppi) – the same as the dpi you are using. Make sure you've selected to maintain the aspect ratio, and then type in a new width or height for the image, to fit your page. Select the bilinear resample, which should produce the best results for a photo, and then click on the OK button.



5 When you've finished, save the file in your preferred format; jpegs are understood by most web browsers and, as you can see here, it reduces the size of the image from the original 221KB to just 23KB – a reduction of around 90 per cent. The other reason it's better to resize a picture is that different browsers may not scale them in the same way on your web pages, messing up your carefully created layouts.

could be cutting out a sizeable proportion of your audience. Right now, it's a fair bet that most users will be able to look at Shockwave, Flash, pdf, and probably RealAudio or QuickTime. Venture off that beaten path too much, however, and fewer people will have the plug-in necessary – or the willingness to download it, if it's available. As more people go online using their TV and an Internet set-top box, you might find that even stalwarts of the web designers' toolbox such as Shockwave aren't such a guaranteed success.

For similar reasons, you might want to steer clear of new formats, such as images using png, until they're widely supported, at least on all the common systems that will be accessing your site. If you don't even know what those are, then it's worth spending time looking at the log files, and gathering information about the browsers that are visiting your site – and don't just do it the first time you put the site up. Review it every few months to find out if, for example, there are more people using PalmOS devices or set-top boxes to

QUICK TIP

Check compatibility. If at all possible, view your site on both Macintosh and PC systems, using Internet Explorer and Netscape Navigator. Don't assume PC and Mac versions of each behave identically – they don't!

Steering the right course around your site



This finished site has clear, easy-to-use navigation. The bar on the left has space for extra features if we need them later, without adjusting the whole design, and the text helps people work out whether or not this is the site they should be looking at. Important contact information is easily accessible, and even if images are turned off, the text links will allow visitors to move around the site.



1 And this was the first version. The buttons on the left only reveal their function when you move the mouse over them – so visitors will have to spend time learning which one does what. The image in the centre makes the text on top of it hard to read, and the colour scheme of the top banner uses red and green, which many people find an awkward combination.



2 To start with, we've made the main text more legible by changing it to black. The background image has been changed, by increasing the brightness and decreasing the contrast, so that it becomes a faint image. The overall effect is to make the text much easier to read. It's advisable never to use images with lots of contrast or strong colours behind text.



6 Contact information is important too, especially for a business website. We've added the name of the company, postal address and telephone number at the bottom of the page. Although it's not a requirement in cyberspace, anyone who is selling should make sure that the proper name of the company is available, just as it has to be on business premises.



7 If you include email addresses on the page, as we've done here, make sure that you use a 'mailto:' link to make them active. And if you're providing a link like this for visitors to use, make sure that it reaches a real person who does respond. There's no point having a 'webmaster' address prominently flagged if mail to it is only read once every couple of months.



8 Now we've split the main table cell into two columns, putting the original picture in the right-hand one, and adding more text in the left. People can see the picture properly without the text on top of it, and there's space to add explanatory text for the home page. The size of the image is, at the moment, specified in pixels in the web editor, so browsers will scale it after downloading.

QUICK TIP

Don't rely on Java or JavaScript for navigation around your site. Use it for shortcuts if you like, but ensure there are ordinary links for people to use with non-PC browsers.

look at your site. An increase in the number of visitors not using Windows might necessitate changing some or all the features on your pages.

Remember too that some people do turn off images – use ALT tags, so it's obvious what to click to get where, and if you're using a clickable image, add text links somewhere on the page too.

Think about design

Compatibility and navigation are elements of the design of a website, but the overall impression

from the text and graphics is just as important. Just as with desktop publishing, having a facility doesn't necessarily mean it's desirable to use it.

DTP, along with countless articles saying things like 'Now anyone can produce a magazine', encouraged many people to do just that. The trick is in realising that just because you have 76 typefaces on your computer, you don't need to use them all on the one page.

The same is true of the web. Unless you have a good reason to do otherwise, keep it simple –



3 The top flag has been changed. Removing the coloured background makes it easier to read. If you do want colours, make sure you have a lot of contrast between them, so people with visual difficulties can make out the words. And if you are using a graphic as a headline, make sure you use the Alt tag to say what the text is, for people with images turned off.



4 JavaScript rollovers may be cute, but icons that don't mean anything are a useless way to present navigation options. We've replaced the icons with a single image that is not only smaller than the sum of the eight previous ones – four buttons, and four rollover buttons – but means that people can see exactly what they're clicking on right away. The bar also includes extra buttons for help and for a site map – not essential, but always useful on a large website.



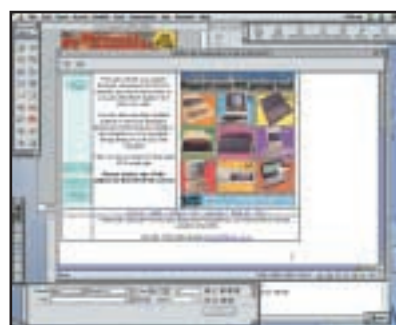
5 Some people won't be loading images, so we've added a set of text links at the bottom of the page. When you supplement an image-map with links like this, make sure they're reasonably close to the image, rather than several pages further down after lots of text.



9 The alignment of the image has been changed by setting the options for both the table cells to TOP, ensuring that it lines up better with the text – but the image still has its size specified directly. According to Dreamweaver, the whole page will take 65 seconds to download – far too long for most visitors to wait.



10 There were two problems with the image. It was too big at over 200KB, and it was saved in gif format. Resize the image so that it's the size you want it to appear on the page, and save it in jpeg format, choosing appropriate compression settings for the size. You can reduce the size of the image to a quarter of its original, or less.



11 Even with a fair degree of compression, you probably won't notice much difference in the quality of the image – essentially the page looks just the same as it did in step 9. But a look at the download information – in the bottom right of Dreamweaver's status bar – reveals that the total size for the page, including all images, is now just 16 seconds.

choose one typeface for headlines, and one for the text and leave it at that. And make sure you choose from the common set that most people will have. There's little point designing your website to look great at 1,028 x 768 using a lovely typeface you downloaded from the net if it's going to appear on people's screens at 800 x 600 in Times Roman, because they haven't downloaded the same font.

You should make sensible use of colour too. Chosen well, it can highlight important areas of

your site, choose badly, the text might well end up unreadable. If in doubt, ask colleagues or friends how well they can make out the words. You'll tend to have more problems with smaller coloured text on a coloured background – something perhaps to avoid completely.

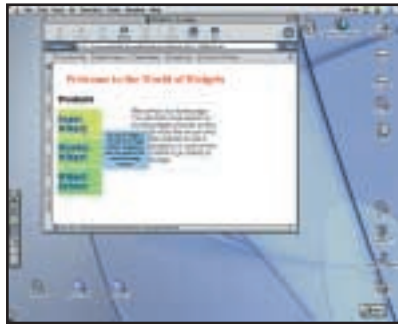
What's it all about?

There is, of course, one thing worse than having information that's hard to read on your site, and that's having no information at all. Don't fall

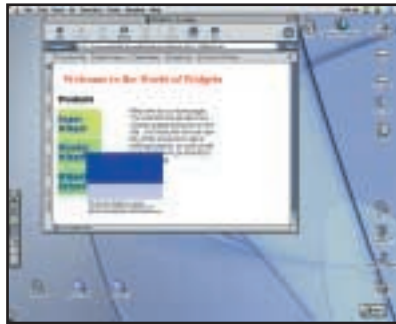
QUICK TIP

Place key information, such as contact phone numbers and addresses, somewhere that's easy to reach and doesn't need any special plug-ins or features to access.

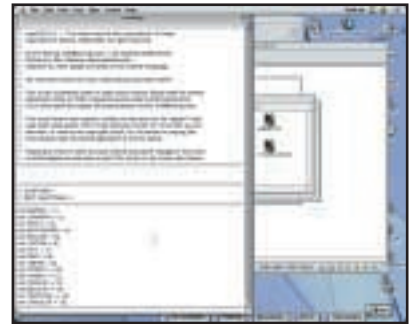
Get the most out of rollover buttons



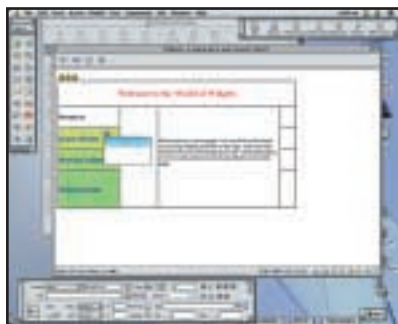
Pop-up messages on websites are pretty common – you move the mouse over something and extra information appears. It's a similar idea to those rollover buttons in the last example, but there's more than one way of doing it, and you could end up losing business if you don't test things properly. In this example, we'll show you how to keep things simple, compatible with version 4 browsers, and quick to download.



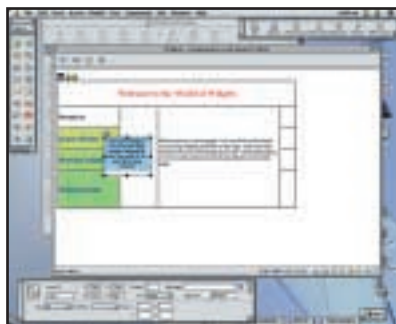
1 For many people, the simple solution is to go to a website that provides JavaScript examples and download one. It's a timesaver, but do make sure you test your pages. On Netscape for Mac and Windows, and Internet Explorer for the PC, this script works fine. Use Internet Explorer for the Mac, however, and all the bits of the pop-up appear underneath each other, making the text illegible. Also, the scroll bars change as the pop-up extends beyond the window!



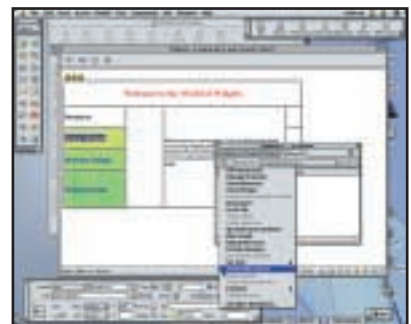
2 This is the culprit – it's called `overlib.js`, and it's a pretty popular download that you'll find on the web. It certainly does the job, but you'll be leaving Mac users with their default web browser out in the cold if you use it. How many of your customers do you want to annoy? By the way, it's over 30KB of text that needs to be downloaded by the browser.



6 We want to distinguish the pop-up from the background of the web page, so after you've inserted the table, set its colour options. We've just set a background colour here, but you could use an image if you really wanted, or set a different border colour too. Remember that putting an image in here will increase the size of the download.



7 Add the text to the table cell and format it however you like. Since we're dealing with plain HTML, you can add any features you like, such as links, within the pop-up – but remember that if you set the layer to disappear when the mouse moves, it might be impossible to click on any links you put in the box.



8 To control the appearance and disappearance of the layers, highlight the link you want to have the pop-up on, then use Dreamweaver's Behaviours palette. Select the type of browser you're designing for – it should be 4.0 and later, ideally. Click the add button and choose Show-Hide Layers from the menu that appears.

QUICK TIP

When using tools like Flash to provide introductions, always provide a link that allows people to skip the animations and get to the information. Large Shockwave or Flash sites should be split into multiple files, so people load what they need.

into the trap of having a wonderful site that uses fancy graphics, and plug-ins, but doesn't even tell people your phone number until they've downloaded the latest version of Shockwave. Frames can cause problems like this too – one ISP a few years ago simply didn't get invited to tender for my business, because I was looking at its site in a text-only browser and saw nothing but 'You need to upgrade your browser to continue'.

The response of many customers – and it's probably the correct one – when they see a

message like that is 'You need to upgrade your business practices to get my money'. Before you get carried away, or believe that people should have the latest gadgets and gizmos to be worthy of viewing your pages, remember what happened to Boo.com.

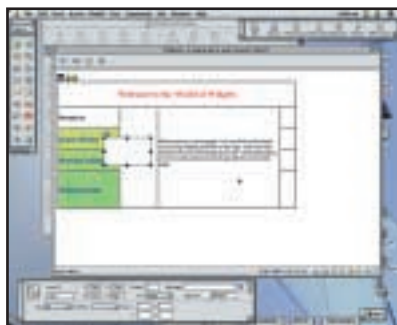
The web may be much more capable of delivering multimedia and 'enhanced user experiences', but all that comes to nothing if people simply can't reach the information they want, quickly and easily.



3 That 30KB of text means you can add things to your page easily; use a `<SCRIPT>` tag to load `overlib.js`, and then say `onMouseOver="return overlib('pop-up text here')"`

(Key: ✓ code string continues)

in your links. First we're going to fix this page by deleting these mouse actions in Dreamweaver. Remember to remove the `<SCRIPT>` tag at the top of the page, so you're not loading the JavaScript library file any more.



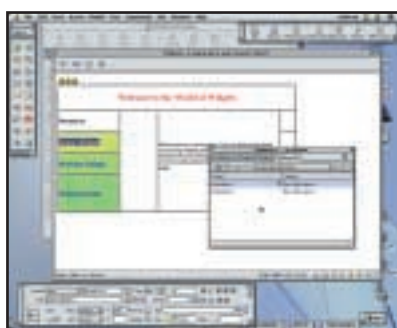
4 We're going to achieve a similar effect using HTML layers. Choose Insert Layer, and position the layer where you want it to pop up. You can use the positioning palette to make sure that all the layers – there'll be one for each pop-up – are aligned as you like. We've made them all the same width, and the same offset from the left side of the page. Give each layer an appropriate name, and set its default to be hidden.



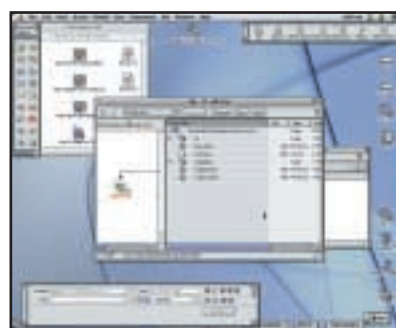
5 To create a border round the text of the pop-up, we'll use an HTML table that's just one cell. Insert the table into the layer you've created and set its width to 100 per cent, so it fills up the whole of the layer. Choose the border and padding options for the table to create the effect that you want.



9 From the list of layers, highlight the one you want to 'pop up' and then click the Show button. If you're not making the pop-ups disappear when the mouse is moved away from the link, you might also want to select the other layers and choose to hide them, so there'll only be one visible at a time.



10 Now select the event type, which should be `onMouseOver` if you want the pop-up to appear when the cursor moves over the link. Add a similar action, using `onMouseOut`, to hide the layer when the mouse is moved away. Remember that if you don't have an action to hide the layer, it will remain on the screen.



11 Once you've added the actions and layers for the other links, you'll have a page that does the same as the original one, but works on more platforms. The HTML file itself is larger – around 2,000 characters more than the original, due to the descriptions of the layers and their tables. But set against that, visitors no longer need to wait while the JavaScript library is downloaded to their PC. You've achieved the same effect, with more compatibility, and a smaller download.

As we said earlier, there aren't any hard and fast rules. What works for one site might not work for another. But if you want your website to avoid falling into the 'needs improvement' category, you'll have to make sure you've planned it, and taken into account navigation, compatibility, design and information. If you only fall down on one of those, you might be doing all right. But two or more, and a lot of people will simply go elsewhere.

So, with those thoughts in mind, take a look

at our sample sites and how we've tried – as simply as possible – to make sure that they'll work well regardless of who's looking at them, without restricting our options.

We're not presenting the finished results as paragons of web virtue – they're just sites we've created to show different ways of doing things. Nevertheless, we hope you'll find the workshops point out ways to achieve the effect you want, without confusing or annoying visitors to your site.

QUICK TIP

Before building the whole site, try out the basic design elements on a cut-down site, and ask other people to see how easy they find it to use. Don't build the whole site, only to discover people can't work out how to move around it.

@Word ?



EXCEL

T O P



A C C E S S

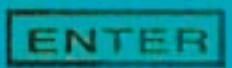
50

T I P S



30

POWERPOINT



Office efficiency

OFFICE MAY HAVE MORE FEATURES THAN YOU KNOW WHAT TO DO WITH, BUT A LITTLE KNOWLEDGE CAN MAKE YOUR LIFE EASIER. TIM NOTT, STEPHEN WELLS AND TIM ANDERSON POOL THEIR KNOWLEDGE TO HELP YOU GET THE BEST OUT OF THIS SUITE

More people use Microsoft Office than any other software suite. It's a huge and daunting package, even for those who have 'grown up' with it and remember the days when Word and Excel were independent products, and Access, Outlook and PowerPoint were just gleams in a developer's eye. The current version, Office 2000, offers everything from 'smart' correction through email and intranet connectivity, to suite-wide integrated programming.

As always, the problem with software that is bristling with features is that you tend to get lost in the bristles while trying to find the features. This collection of 50 tips won't make you an Office expert overnight, but it is designed to make your Office experience easier, speedier and more satisfying. We've included tips for overcoming irritations, saving keystrokes and mouse actions, solving problems, and exploiting features that perhaps you never knew existed. We hope that, as usual, there will be something for everyone, from raw beginners to seasoned power users, from coping with junk email, through producing slick presentations, to performing case-sensitive searches in Access.

Although Office is primarily aimed at the business community, we haven't left the home users out. If you want to know how to create a digital photo album in just a few minutes, or get one-click access to sending an email to your best friend, read on.

We've grouped these tips into the five major components of Office: Word, Excel, Access, PowerPoint and Outlook, and with scrupulous even-handedness we've awarded them 10 tips each. However, although some of the tips are assigned to the section where they'll be most useful, for example, proofing tips in Word and graphics tips in PowerPoint, many of these, such as the drawing toolbar tips that are listed under PowerPoint, can be used in one or more of the other applications.

ILLUSTRATION GAVIN REECE



Word

1 Avoid master documents

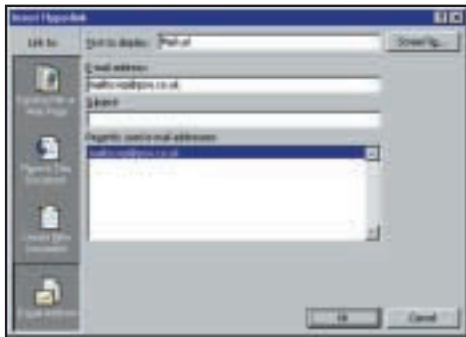
Tempting though this may be, there have been many reports of lost or corrupted data when using master documents. If you want to split a document into chapters – possibly with chapter/page numbering so you don't have to reprint the entire document when one chapter is edited – use section breaks instead, or split the document up into separate, independent files.

2 Updating hyperlinks

By default, Word 2000 turns anything it thinks is an email address or a URL into a live, working hyperlink. There is a snag to this: if you mis-type the address, and then correct it by using the cursor keys to 'get in' and edit it, the underlying hyperlink won't update. You need to right-click on the link, then Edit Hyperlink.

3 Getting rid of hyperlinks

If you find this auto-hyperlink feature irritating – after all, it's not much use in a printed document – you can turn it off from



With auto-hyperlink turned off you can still create links or use 'Mail us' as the link's title

Tools, Autocorrect, Autoformat As You Type. You will still be able to create hyperlinks by highlighting text or graphics, then pressing Ctrl & K. Although Word will fill in anything that looks as though it's a valid address as the link, you can override this manually and have, say, 'Visit my website' or

'Email me' as the visible title of the link.

4 Getting to know Autocorrect

This is one of the most useful, and most frustrating, features of Word. If you frequently mis-type a word, eg Intenet or Rebbot for Internet and Reboot, then right-click on the red-underlined word, but instead of clicking the relevant suggestion, go to the Autocorrect option on the context menu. You'll see the same suggestions, but your mistake will get added to the Autocorrect list. You can also remove entries (Tools, Autocorrect...) and make exceptions, so PCs, for instance, doesn't get changed to Pcs.

5 Easy column selection

You probably know that you can select columns in a table by clicking at the top of them. But do you also know that you can do this for ordinary tabbed text? Alt & drag selects a rectangle of text anywhere on the page.

6 Selecting lots of text

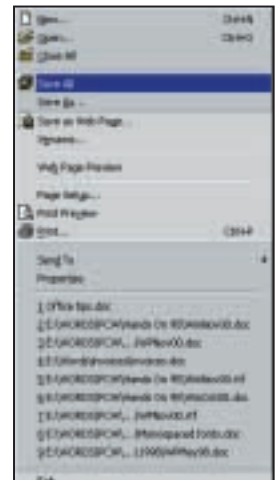
Trying to select more than a window-full of text can be frustrating, especially with a fast display card, as the highlight tends to shoot

back and forth past the intended selection.

Left-click once where you want to start, use the scroll bar to navigate until the end of the intended selection is visible, and Shift & click again.

7 Saving grace

Despite Word 2000's single document interface, there is a way to save all open documents, or close them, without closing Word. Hold down the shift key as you drop down the file menu and you'll see two new commands, Save All and Close All.



Save all open documents

8 Keeping tabs on the File, New dialog

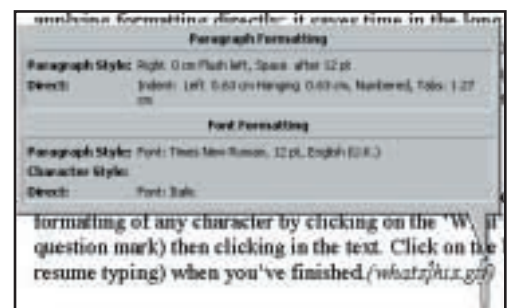
If you want to create your own custom tabs on the File, New dialog, it's easy. Just navigate to your main template folder in Windows Explorer, and create a new folder within it.

9 Careful formatting

It's a good rule to use paragraph or character styles to format text, rather than applying formatting directly. This saves time in the long run and keeps documents consistent. However, rules were made to be broken, and there may be times when you've created some custom formatting that you'd like to repeat. If you click the Format Painter button (it looks like a brush) then 'dip' it in the formatted text you want to copy, you can then 'paint' other text by dragging the brush through it.

10 What's it all about?

On a related note you can see a list of the paragraph, character and direct formatting of any character by clicking on the 'What's this' button (arrow & question mark) then clicking in the text. Click on the button again (or just resume typing) when you've finished.



What's this? Formatting details at a glance

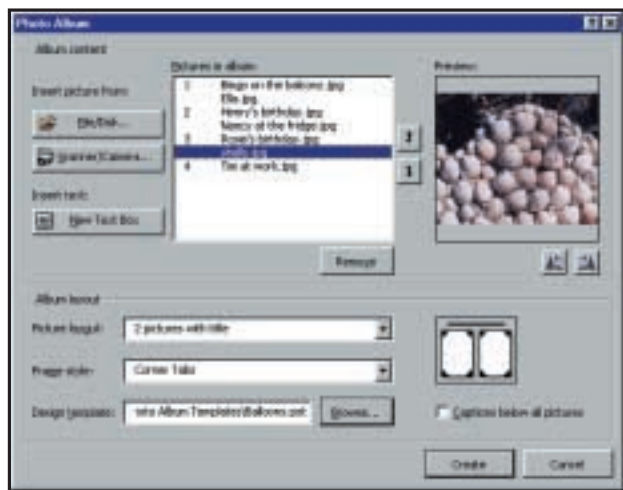
PowerPoint

11 Get organised

If you're used to organising your presentations in PowerPoint's outliner, then remember that you can also use Word's rather more powerful equivalent. Each top-level entry denotes a new slide, with lower levels forming nested, bulleted lists. 'Normal' text is ignored. A tip-within-a-tip: don't bother trying to import the Word file into PowerPoint, instead, while still in Word, go to File, Send To, PowerPoint.

12 Phototastic

The free Photo Album add-in is available from <http://officeupdate.microsoft.com/2000/downloadDetails/album.htm>. This lets you create a photo album from images on disk, a scanner or a digital camera. You have a choice of the number of pictures per page, frame style, backgrounds and captions: the last are generated from the image file name. The whole business takes just a few mouse clicks.



You can create instant albums with the PowerPoint add-in

13 Pack up and off you go

Having done this, you can use the Pack and Go Wizard to send the entire presentation or album to someone else (File, Pack and Go). If they don't have PowerPoint, you can include the PowerPoint standalone viewer. There is an option to span multiple floppy disks: this takes time as the files involved are large, but the process just involves inserting new disks when prompted.

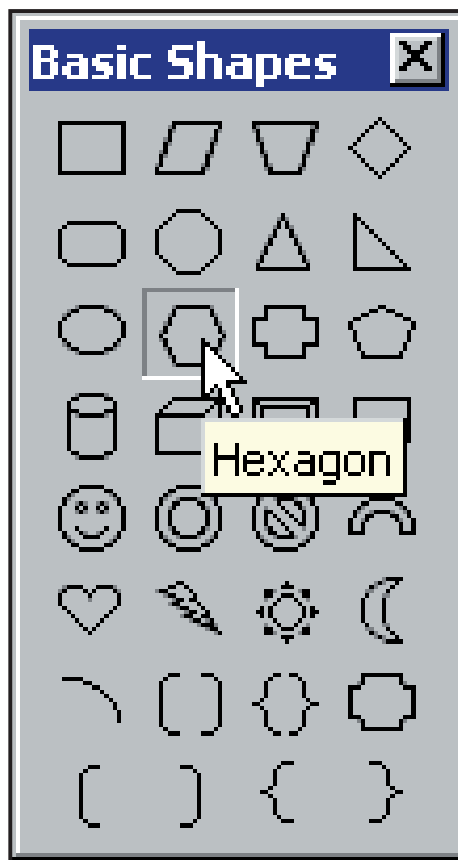
14 Make it simple for the recipient

Unpacking the viewer and presentation is not granny-proof, so it would be wise to include instructions. Two files need to be sent - the ppz file itself and pngsetup.exe. The recipient needs to run the latter, which will ask for a destination folder. This has to be typed in as there's no Browse button, and the folder name must be no longer than eight letters, without spaces: one for nostalgia fans. This will decompress the various

files needed (again with prompts to change floppies, if applicable), and the recipient can then run ppview32.exe from the aforementioned destination folder. This will produce a standard File Open dialog with a ppt file visible in the contents. Select this, click Show, and the full-screen slideshow will begin.

15 Standalone toolbars

When you use the drawing toolbar, you can drag the nested palettes off the AutoShapes menu to create standalone toolbars. This tip (and the next two) work in all Office situations where the drawing toolbar is visible.



Drag out palettes for instant access

Getting sticky with it

16 If you double-click instead of single-clicking on a shape tool, it becomes 'sticky': you can continue to use the tool to create further shapes without having to select it each time. Click the tool again, (or any other tool) to unstick it.

17 Inherently stylish

Having chosen fill and line styles and colours for a drawing object, you can right-click and Set Autoshape Defaults and all new shapes will inherit these styles, except for text boxes. Note that this last exception doesn't work for Word and Excel.

18 Useful shortcuts

In addition to the standard Office keyboard shortcuts, PowerPoint has a few that are all its own. Ctrl & M inserts a new slide, Ctrl & D duplicates the current slide, Ctrl & G toggles the guides on and off, and F5 starts a slide show.



19 Pause in black and white

If you're giving a slide show on screen, you can pause the show by pressing the full-stop key (or b). The screen will go black. Press the key again when you are ready to continue. If you'd prefer a white screen, press the comma (or w) instead.



20 The Office Assistant may be useful after all

Designing a good presentation takes special skills. As well as being a good communicator, you need a modicum of artistic talent if you plan to stray from the predefined templates. The much-maligned Office Assistant can be quite useful here, with the 'lightbulb' suggestions offering useful advice on layout and spotting potential problems. You can fine-tune the rules from Tools, Options, Spelling and Style.

Outlook

21 Taking care of the journal

Among Outlook's many talents is the ability to keep a 'journal' of meetings and task requests, emails, and all the Excel and Word files you work with, noting the time and date of opening, saving and closing. Unless you really need this facility we recommend that you turn it off (Tools, Options, Preferences, Journal Options). It can add substantially to the time taken to open, close, and save files: as the journal grows, so does the delay.

22 Erase your history

Even with all the journalling options turned off, you can still see a history of mail sent and received on a per-contact basis: go to the Activities tab on the contact's details.

23 Updating the date

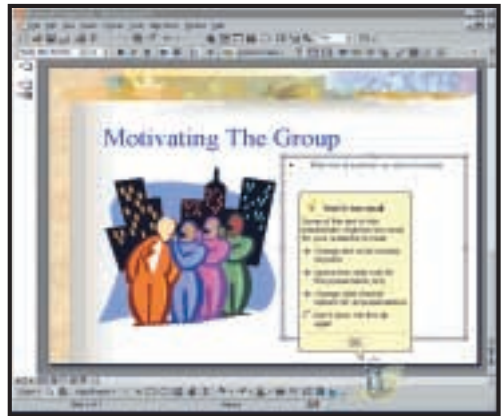
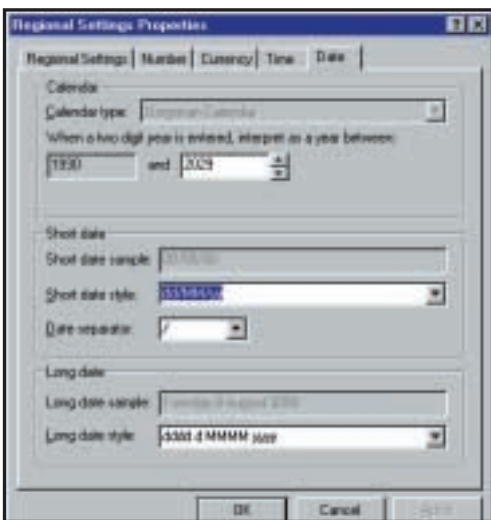
Don't go trawling Tools, Options if you want to show the days of the week in the Calendar weekly view: this option is set outside Outlook. Go to Windows Control Panel, Regional Settings, Date and set the Long Date style to 'dddd d MMMM yyyy'. The change will be reflected in Outlook immediately.

24 Plain text makes sense

Keep your emails lean: plain text messages are less than a third of the size of HTML or Outlook Rich Text.

Hence you'll be saving both yourself and the recipient storage space and connect time: in addition HTML and Rich Text messages may contain information that is unreadable by non-Outlook users. You can set this globally in Tools, Options, Mail Format; for individual recipients it is set in the General tab of their Contacts entry, or for individual messages from the Format menu in the message window.

*What day is it?
The answer lies in
Control Panel*



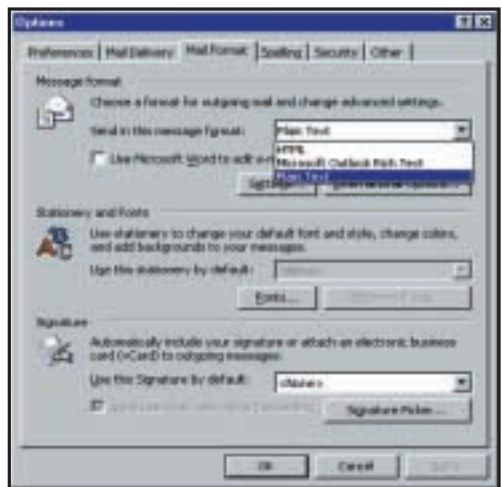
Good advice from the Office Assistant

25 Composing offline

If you're working from a dial-up connection, then it makes sense to read and compose your messages offline. You can set this from the File menu. Messages you compose will be stored in the Outbox until you click the Send/Receive button: this will instigate a dial-up connection. You should also check the Tools, Options, Mail Delivery dialog; in particular, clearing the 'Check for new messages every...' and setting the 'Hang up when finished...' options will reduce your online costs.

26 Adding addresses to the toolbar

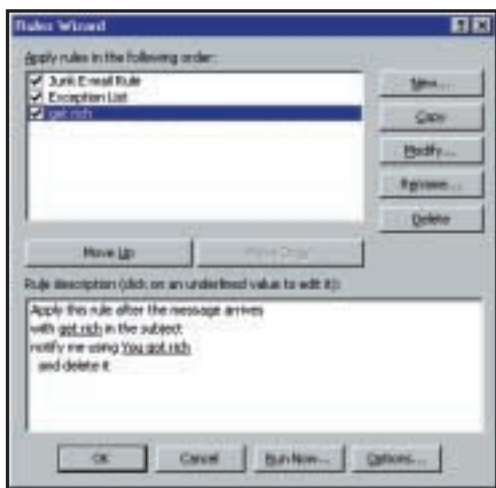
If you frequently mail some of your contacts, they can each have their own toolbar button. From Tools, Customise, select the Mail Message command in the File category. Drag this on to a toolbar and release. Right-click and from the context menu, first type a name for the contact, then make sure Image and Text or Text only is selected. Finally, from the same context menu, Assign Hyperlink, Open... Fill in the email address and, optionally, a default subject. Close the Customize dialog, and your new button will be ready to instantly launch a pre-addressed message.



Plain text makes plain sense when writing emails

27 Getting rid of Spam

You can opt to delete certain types of message without reading them. This can be useful, say, if there's a known virus going around, or you are being spammed with junk email. Run the Rules Wizard from the Tools menu and follow the prompts. There are too many options to go into detail, but it's all self-explanatory. One point to watch is that if you tick more than one filtering criterion, such as 'Specific words in the subject' and 'Specific words in the body', both conditions must be met. If you want either to apply, make separate rules.



Rule spam out of your life

28 Building your contacts

When you receive an email from someone, it is easy to quickly add their details to your contacts list. Double-click the message title in the In Box to expand it to a full window, though this won't work in the multipane preview mode. Right-click on the sender's address at the top, and choose 'Add to contacts'.

29 Highlighting spam

Another way to deal with spammers is to hit the Organize button while viewing the Inbox, then turn on the Junk email feature. This gives you the option to either colour suspected junk messages, or move them to a specified folder. Having turned this feature on, you can right-click on message headers in the Inbox, and add the sender to the junk list. The same applies to 'Adult' mailings.

30 Get to know the shortcuts

Finally, Outlook also has some handy keyboard shortcuts. When you're looking at the calendar, Alt & Up Arrow takes you back a week, Alt & Down, forward a week; Alt & Home goes to the beginning of the week, Alt & End to the end; Alt & Page Up goes to the start of the month, Alt & Page Down to the end.

**Access****31 Discover the Zoom key**

Access has a habit of presenting information in grids that only show part of each field. Of course, you can fiddle with font sizes and column widths, but a handy tip is to press Shift-F2 to zoom into a field. What really happens is that the field contents open in a separate window, making it much easier for serious editing. This also works in the Query designer, for example to save you typing long expressions into a tiny Criteria field.

32 Don't store images as OLE objects

The official way to store images in Access databases is by using OLE (object linking and embedding) objects. Although this is easy to do, there are many disadvantages, including a bloated database size, unpredictable behaviour on different systems, and problems accessing the graphic through code. One better way is to keep the images as external files, storing just a

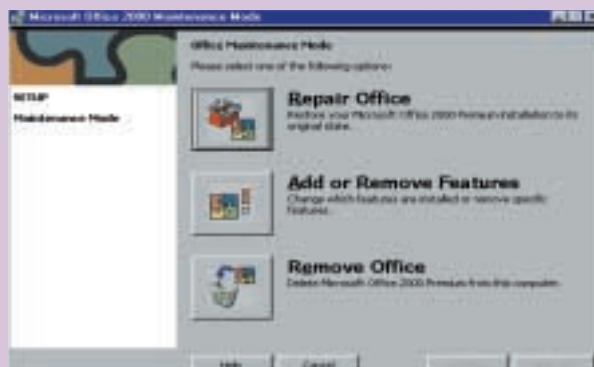
Installation decisions

If you've ever struggled through the installation routine of any of the previous versions of Microsoft Office, the number of decisions you find yourself having to make is bewildering. Should you install all those converters just to be on the safe side, or will they just stay unused, cluttering up the hard disk? The Office 2000 installation makes a great leap in user-friendliness by letting you say 'maybe'.

Most components offer four options: install onto your

hard disk as normal, run from the CD, be not available, or install on first use. This last option is the 'maybe'. The feature won't be copied to your hard disk, but will appear, for example, in menus. If and when you go to use the feature, you'll get a prompt to insert the CD, and the relevant files will be copied to your disk.

But there's a slight downside to this. If you've chosen, say, Word's Wizards and Templates to be installed on first use, you'll get several



tabbed pages of these in the File, New dialog. You can't remove these 'phantoms' individually, but you can limit the view to just your own

templates by going back to the Setup routine (Control Panel, Add/Remove) and changing the Templates and Wizards to 'Not Available'.



path name in the database, and using the Image control to display the graphic on a form. If you need to store the image itself within the database, save it as a BLOB (Binary Large Object) rather than an OLE object. You can display it by writing code that saves the image to a temporary file before showing it on a form. Example code is in Microsoft's KnowledgeBase or is widely available on the web. In this case, you can get better performance by keeping images in a separate Microsoft database (MDB) and linking the table.

33 Avoiding nulls Null values are in theory a 'good thing', because they let you distinguish between unknown and empty values. In many cases, though, null values are a nuisance. To prevent null values in a field, open the table designer. For text and memo fields, set Allow Zero Length to True and the Default Value to "" (two double quotes). For other field types, ensure that there is a Default Value. Note that this will not affect existing records. If you have to work with null values, use the IsNull function or the special criteria IS NULL and IS NOT NULL in the query designer. In general, if you are getting unexpected query results, null values are often the cause. Fields with null values will never be selected by a query unless you specifically ask for them.

34 Do case-sensitive searches Access is generally regarded as case-insensitive. However, you can do case-sensitive queries using the StrComp() and InStr functions. Use StrComp to match a whole field, and InStr to match any part of the field. For example, here's how to search for 'van' but not 'Van' in an Artist field. Open up a query in design mode, add the required fields to the grid, and then enter the following at the top of a blank column:

```
InStr(1,[Artist],"van",0)
```

Access will prefix it with "Expr1:", but don't let that worry you. Now enter:

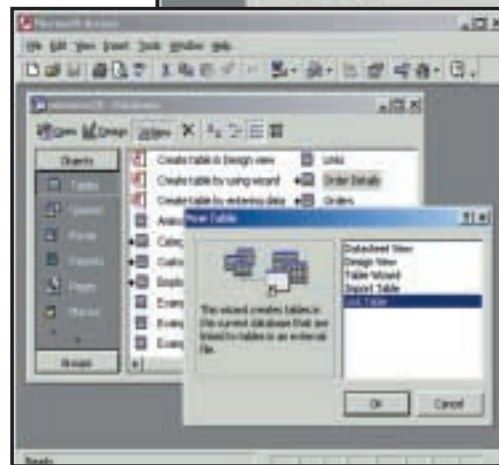
```
>0
```

in the Criteria row and run the query. This will return 'van Eyck' but not 'Van Gogh'.

35 Control start-up macros In an Access database, if you name a macro AutoExec it will run automatically when



Above: Working with images? Try not to store them as OLE objects



Left: Link table lets you use more than one MDB, which can enhance performance

the database is opened. If you press Shift, the macro will not run. If you are really insistent, you can prevent Shift from bypassing the start-up code by setting the AllowBypassKey property to False. Unfortunately you have to do this using Visual Basic code, but a full example can be found in online help. Search for AllowBypassKey.

36 Use sub-queries in SQL SQL sub-queries are a powerful technique for data manipulation. For example, imagine you have two versions of the same table, and you want to append rows from one to the other, but only where they do not already exist. Assuming a primary key field called ID, here is the SQL:

```
INSERT INTO artists
SELECT NewArtists.*
FROM NewArtists
WHERE NewArtists.id Not In (select
Artists.id from Artists);
```

(Key: ✓ code string continues)

37 Decompile mode – an undocumented recovery technique Stuck with a corrupt MDB? According to Microsoft, the undocumented decompile mode for Access 2000 can fix corruption that the ordinary repair utility cannot manage. To use it, run Access with the command-line argument:

```
/decompile "dbname"
```

where dbname is the full path to your database. You can do this by editing a shortcut. This tricks

Access into thinking it must change the binary format. Note: before trying this or other repair attempts, make a backup of the errant MDB.

38 Split data and code If you share an Access database over a network, consider using one MDB for all the forms, reports, macros and VBA code, and another for the data. Use the Link table feature to attach the database tables to the application MDB. Now you have the option to store the application MDB on workstations while keeping the data in a shared location, speeding performance. The downside is that if you update the application, you must take care to replace all the copies, perhaps using a login script.

39 Defrag before compact Two ways to improve performance are to defragment your hard disk and to use the Compact and Repair utility in Access to optimise an MDB. When you do this, it is best to defragment first. If you Compact first, the MDB is likely to be surrounded by used disk space, slowing access when data is added. Defragment followed by Compact is likely to leave the MDB with adjacent free space, which is the ideal scenario.

40 Use indexes with care Indexing a column in a table speeds searches on that column, but every index you add slows down database updates. The value of an index therefore depends on how the data is used. If you have lengthy update routines on a large database, you can often improve performance by removing indexes other than the primary key before the update, and rebuilding them later, using VBA code to automate the process.

Excel

41 Getting columns in shape To quickly adjust the width of various chosen columns, hold down Ctrl as you click the column heading letters, then drag a heading boundary of any of the columns. A tip box will display the column width. To adjust the width of adjacent columns, hold down Shift as you click the first and last columns then drag the right-hand boundary. These tips apply similarly to rows.

42 Formula creation To create a formula, click the often-neglected Paste Function tool (marked fx) on the Standard toolbar. Select a function and a description appears in the Paste Function dialog box. The Help button leads to examples of use of the function. As an alternative to this tool, click the equals sign in the Formula Bar and the Name Box on the left will list the most recently used functions.

43 Autocalculation For quick calculations on a worksheet, use the AutoCalculate feature. Select a range of figures and a total of them will appear in the Status Bar. Right-click on this total and you can change it to an average or a count of the numbers in the range. AutoCalculate can also show you the biggest or smallest number in the range. If the Status Bar isn't displayed, select it on the View menu.

44 Organising drawn objects To line up drawn objects, like rectangles, with worksheet cells first click Draw, on the far left of the Drawing toolbar, then Snap, then To Grid. To line up drawn objects with each other click Draw, Snap, To Shape. To line up two

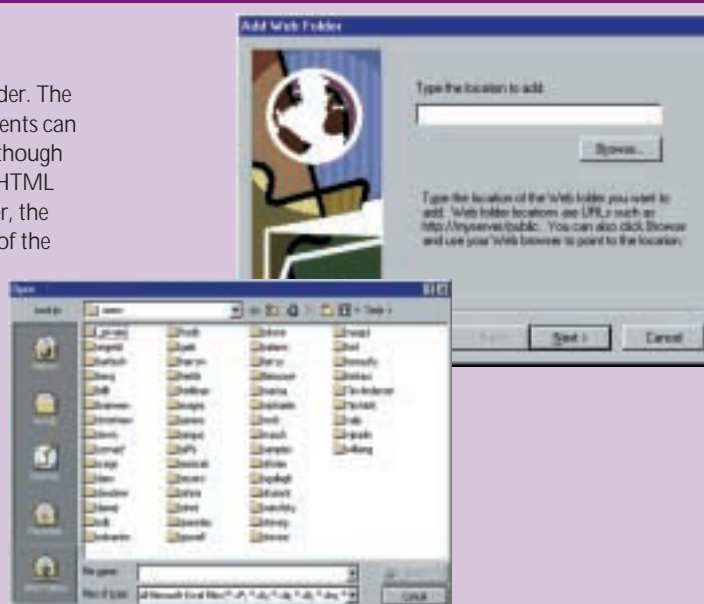


Saving for the web

When Office 2000 launched, Microsoft's big selling point was its intranet-awareness. Users can save files as web pages straight onto a corporate server for others in the company to browse. This also works on the Internet in general: if your web-hosting provider allows it, you can post Office documents straight on to your website.

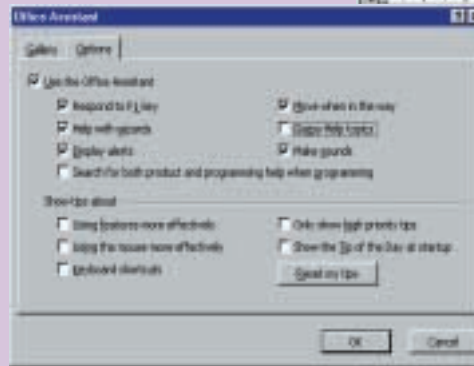
The 'Web Folders' that you save to are actually shortcuts to a web server, though they appear as folders in the Save/Open dialog, and saving files in them is exactly the same

as saving to a local folder. The clincher is that documents can be 'round-tripped'. Although they are converted to HTML for display in a browser, the actual binary content of the file is also preserved so another user can open your web-page spreadsheet straight into Excel without any loss of function. Sadly, this hasn't taken the world by storm to the extent that Microsoft envisaged.



Office Assistant

The Office Assistant has been greatly improved since its debut in Office 97. It now roams the desktop as a free-range sprite, rather than being confined to its own box. More importantly, it's become much easier to tame. You can show or hide the Office Assistant temporarily, and a range of options can prevent it from offering those irritating 'It looks like you're writing a letter...' messages. Best of all you can turn it off completely and return to a browser-style help file where it is much quicker to find the information you need.



Stating the obvious was one irritating feature of the Office Assistant, but you can now tailor this function to really help

different sized drawing objects with each other select them (by holding Shift as you click them both) then choose Draw, Align, Align Bottom.

45 Quick charts The fastest way to create a chart is to select the full range of a table (including labels) and press F11. Excel will draw a column chart on a new interactive chart sheet, with the x and y axes labelled, colours chosen for the data series, and a legend box in place. You can right-click on any part of the chart to change any aspect of it.

46 Sorting out problems with links You can often solve problems with links to other workbooks or Office applications under Workbook Options. Find this under Options on the Tools menu. Make sure the Update Remote References box is checked. If you check the Save

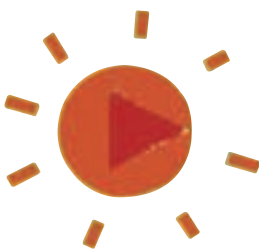
External Link Values box you won't have to worry about maintaining links. However, if the link is to a large range it will greatly increase the size of your workbook file.

47 Simple sub-totals To create sub-totals in accounts, use the function =SUBTOTAL(9,B4:B9). The 9 is a function number and represents SUM. The range to sub-total in cell B10 is B4 to B9. You could repeat this for, say, B11 to B16 with another sub-total in B17. Then if you click on cell B18 and the AutoSum tool it will display the total of cells B10 and B17 only.

48 Getting decimal To convert pounds and ounces to kilograms, use the CONVERT function found in the Analysis ToolPak. Enable it by using Add-Ins on the Tools menu. If the pounds are entered in cell A2 and the ounces in B2 then the formula will be = (CONVERT (A2, "lbm", "g") + CONVERT (B2, "ozm", "g")) / 1000. Here lbm and ozm, entered in quotes, mean convert from pounds and ounces to g for grams.

49 Deleting versus clearing Confused about the difference between deleting a cell and clearing a cell? If you click a cell and then press Delete or the Backspace key, the cell's stored value is removed but its formatting and comments remain. If you clear a cell, everything goes and it's as blank as a cell on a new worksheet. To do this press Alt & e then a (the Alt key with 'e', then 'a' twice).

50 Perfect printing If you have a multi-page worksheet to print and you want the column titles or list field names to print on every page, click the worksheet and choose File, Page Setup, and then the Sheet tab. Click the red arrow in the 'Rows to repeat at top:' box, then click then on row number 1 (or hold Shift and click on 1 and 2). Then click OK.



	A	B	C
3	Jan		
4	Tom	£ 265.88	
5	Jane	144.44	
6	Harry	66.33	
7	Vikki	618.00	
8	Arthur	55.66	
9	Ruby	36.52	
10	RED TEAM	£ 1,186.83	
11	Richard	235.00	
12	Charles	258.50	
13	Joan	284.35	
14	Betty	312.79	
15	Liza	344.06	
16	Jerry	378.47	
17	BLUE TEAM	£ 1,813.17	
18	GRAND TOTAL	£ 3,000.00	
19			

Creating sub-totals the easy way

Software



for rent

WHY BUY SOFTWARE WHEN YOU CAN RENT IT? APPLICATION SERVICE PROVIDERS CAN TAKE THE HASSLE OUT OF THE SOFTWARE NIGHTMARE, SAYS GORDON LAING



HAVE YOU EVER ASKED YOURSELF why you spend so much time and money installing and upgrading software, not to mention getting it working smoothly on your system? What about then discovering that the PC you thought was more than capable of handling the latest packages has just about ground to a halt, demanding some serious upgrading of its own? Then there's the ongoing situation of keeping your system maintained, backed up and fully operational. It can be a total nightmare for a single user, let alone the poor IT manager who has to look after even a small company's fleet of PCs. No wonder they fear the day they have to deploy a new application or, heavens above, a different OS.

However, there is another way. Believe it or not, there's no need to own software at all – you can simply rent it when you need it. We don't mean borrowing a CD-ROM for a few days, installing it, then honestly removing it after an agreed period. We're talking about outsourcing the whole shebang to an Application Service Provider (ASP).

The ASP buys the software, installs it on its servers, and ensures it's fully operational. The ASP worries about maintaining its system, upgrading hardware and software as required, hunting down nasty viruses and backing up essential data. The ASP answers your technical support

questions and sorts out short-term licences. In short, the ASP does all the hard work, letting you simply connect over the Internet and run its programs on its servers as and when you need to, in return for a simple rental fee.

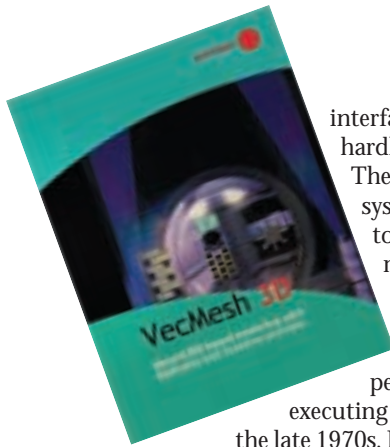
If a co-worker also wants to run the applications, they simply rent them too and start working straight away, without worrying about installations or hardware upgrades. Since the programs are entirely executing on the ASP's servers, your access device could be a modest PC, or even a simple information appliance. Total cost of ownership? Forget it – it's the ASP's problem.

Déjà vu

Think you've heard it all before? The ASP concept certainly sounds similar to the old days of mainframes and dumb terminals. This idea went along the lines of having one single powerful machine that contained all your documents and applications. Programs and data were accessed using dumb terminals, which were little more than keyboards and screens connected to the powerful server across a local or wide area network. The advantage was that there was only one machine to look after, making administration fairly straightforward.

On the downside, the green screens and command-line

ILLUSTRATION: SIMON DOWNS



interfaces of the terminals could hardly be described as user friendly.

Then there was the fact that such a system required dedicated IT staff to look after the server and maintain the network – fine for a big company, but not so good for small businesses or individuals. People needed a personal computer, capable of executing applications by itself. Then in the late 1970s, Intel made a chip, IBM phoned Bill Gates, and the rest, as they say, is history.

PCs are wonderful machines, offering powerful features that are relatively simple to use, but the fact remains they're easy to damage. You've only got to consider the impact of emailed viruses to see how vulnerable both individuals and entire workforces are. Even users innocently installing software can cause all sorts of trouble.

Then there's the cost of buying a fully licensed copy of an application for every user who needs it, not to mention the time and cost of installing it and making hardware upgrades if required. It all seems a bit like overkill when you have to buy a full copy of PowerPoint and upgrade your PC to run it even if you may only make one presentation a year.

Back to the future

There have been several attempts over the years to revive the client-server model of long ago. Failing to make a big impact was the Networked Computer (NC). The NC's greatest supporters were Sun and Oracle, which quite rightly realised that we only tend to use small portions of an application at a time.

For example, this feature was written in Microsoft Word, but mostly used just the basic word processing functions, leaving spell checking to the very end, and never once touching the sophisticated graphing and desktop publishing tools of the application. In this instance, why bother having the entire application suite taking up unnecessary space on your local machine? Simply download the components you require from a centralised server across a local network and execute them on relatively modest terminals, described as thin clients.

It's a nice idea, but one that never really caught on. The client devices, which used Java interpreters to run the required components, were indeed thinner than fully-fledged PCs, but with built-in memory and processors, they weren't thin enough to financially tempt companies to make the switch.

More successful is server-based computing that, like the original mainframe systems, entirely executes applications and stores user data on hefty servers, leaving access to potentially simple client devices.

Citrix is the leader in server-based

computing with its MetaFrame Independent Computing Architecture (ICA), and MultiWin products. Microsoft licenses MultiWin as part of Windows Terminal Server, allowing multiple users to execute the same applications from a single server, in separate protected sessions.

The user experience is very much like remote controlling another PC, where the server's own desktop is presented in a window on your monitor and controlled by local mouse and keyboard commands. Simply click on the Start Menu of this remote desktop and fire up the applications you require. The clever bit is that the programs and data are hosted and executed by the server alone, leaving the local client almost twiddling its thumbs. The only data being transferred across the network between client and server is the keyboard and mouse commands along with display updates. Citrix believes its ICA protocol can carry such traffic over a relatively modest 20Kbits/sec network link, which makes it possible with a modem or even forthcoming mobile data services.

Rather than requiring the local processing power of PCs and NCs, Windows Terminal Server can deliver graphically rich and familiar environments to very simple Windows-based terminals (WBTs), running traditional or embedded OSs. The WBT client contains only the minimum amount of software necessary to boot the device, establish a connection to the server and present the user interface.

The ASP difference

The two things NCs and WBTs required was a server with a suitable multi-user operating system and a network, both managed by the user. Sadly this excluded most individuals and small businesses simply looking for some help installing and maintaining applications.

An ASP uses the server-based computing model, but the difference is that the network is the Internet itself, and the ASP looks after the server. So long as you can get on the Internet, you can use an ASP, eliminating the need to build or maintain your own network infrastructure. But since everyone and their dog are already on the Internet, why is it we've only just started hearing about ASPs?

The answer lies with your connection to the Internet. If you're remotely executing applications over the Internet, you'll want a quick connection that's always on, which eliminates anyone who uses modems with dialup accounts. ASPs have, in fact, been in business for several years, but dedicated to companies that can afford the high cost of a leased line permanent Internet connection. Consequently their services reflected the needs of such customers.

Many such businesses desire high-end applications and services, such as Enterprise Resource Planning (ERP), ecommerce, data analysis, training, asset management, payroll

and salesforce automation. Others want powerful collaborative tools and properly maintained Exchange Servers, but haven't the time, money or experience to do it themselves.

This is where ASPs are currently cleaning up, renting previously unaffordable or difficult to maintain enterprise-level solutions to medium-sized businesses, as and when they need them. They're also popular with the largest businesses that have realised that outsourcing various applications and services is often cheaper and easier to manage than purchasing them outright and using a dedicated MIS department to deploy and maintain them. It's certainly a neat model when a company wishes to quickly expand or trial new software before making huge deployment investments – scalability no longer becomes an issue.

Financially the application hosting model works well for both the user and the provider, as each has a steady flow of predictable spending and revenue as opposed to waiting the typical year or two before heavily investing in or delivering a brand new piece of software. The software developers also particularly like the ASP model as the controlled renting of applications effectively eliminates local piracy.

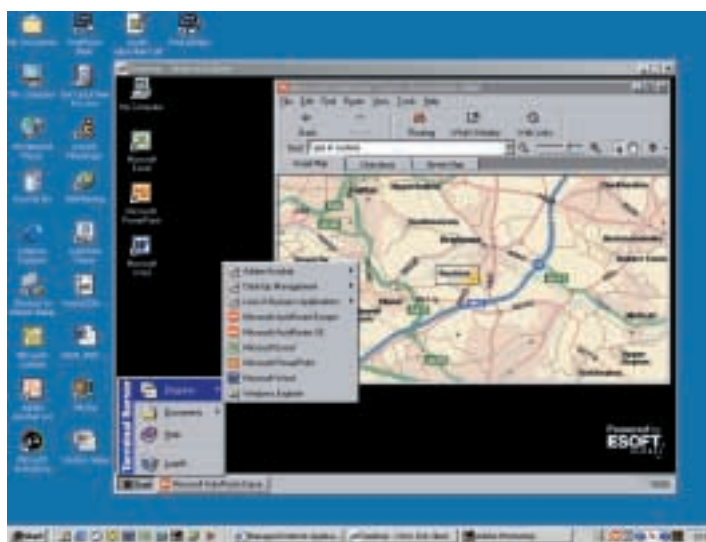
ASPs and small businesses

It's easy to see how compelling the ASP model is for medium to large enterprises, but what about smaller businesses or individuals? As discussed above, running remote applications over an Internet connection really requires a fast permanent link, which until recently has been beyond the reach of most SMEs.

By the time you read this, though, BT will hopefully have sorted out its technical issues with ADSL, and be offering an always-on connection to the Internet at up to 512Kbits/sec for £40 per month to a large number of UK users. The UK's cable giants are also gradually beginning to roll out broadband cable modem services beyond trial areas, offering similar levels of performance to ADSL at comparable or even lower prices. By the end of this year, affordable broadband will be available to SMEs, and ASPs are already gearing up to target this new market. The ASPs, of course, only license, execute and maintain services – they still need co-operation and support from the software developers.

Microsoft has already put a lot of effort into its application hosting strategies, documented at its website (www.microsoft.com/apphosting). The new Microsoft ASP Licensing Program allows ASPs to license Microsoft products on a monthly subscription basis, providing services for a monthly fee to their end customers. Microsoft also operates an ASP certification program, making it easier for end users to select quality providers.

Microsoft's rentable products are delivered using Windows Terminal Server, which presents

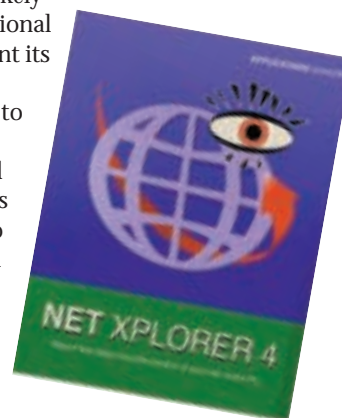


a complete remote Windows 2000 desktop in a window on the client's device. Simply click the icons or buttons you require as if they were on your own PC. The ASP will normally also provide some private, secure remote storage space for your documents, the advantage being that you don't need to worry about making sure you've got your files with you when you leave for a trip or work in a different office.

Microsoft products became available on a subscription basis, from 1 August in North and South America and 1 September in Europe and Asia. At the time of writing, the North and South America services had just been launched, but actual pricing details were scarce for the large number of ASP partners (including BT) listed on Microsoft's website. It's also thought that the lower price of IT products and communication services in the US may result in cheaper ASP deals than we'll have in the UK. Sadly, despite the Internet being the network that delivers the services, it's unlikely that Microsoft's various international licences will allow a US ASP to rent its services to a UK user.

The Microsoft products likely to be of most interest to SMEs on a rentable basis are Office 2000 and Exchange Server. Microsoft claims that Office 2000 was developed to perform at the optimum level in a hosted environment, and apart from modified splash opening screens and non-animated assistants, it's essentially the same suite you get on a standard desktop installation. After much trawling we found some prices on ASP Personable.com's website (www.personable.com), which was renting Office 2000 Standard in the US for \$19.95 (£12.50) per month to individuals or \$14.95 per month to corporate users. Office 2000 Premium weighed in at \$36.95 per month for individuals or \$26.95 for corporates; individual

Windows Terminal Server gives the user a remote Windows 2000 desktop



Office components were also available for \$9.95 or \$6.95 a month for individuals and corporates respectively. In the UK, BT said prices will start at £4 per month for its Office 2000 ASP service.

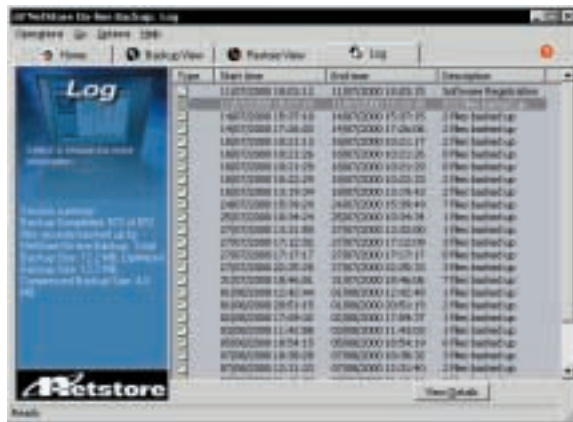
Exchange 2000 Server is also an ideal service to be outsourced. An ASP can offer a well-maintained secure service with shared address books or schedules, public calendars and larger mailboxes than you'd like to manage yourself; workflow and collaborative tools can also be well-implemented in this environment. Users access the services using Outlook 2000 from a PC, or Outlook Web Access from any device that can access the net – great for mobile workers.

Lotus, too, has recently announced ready-to-rent collaborative applications and a hosting platform for ASPs. Lotus QuickPlace handles team collaboration and allows users to share documents and discussions, while Domino Web Mail offers easy access to Lotus corporate email and scheduling information. Further details on the Lotus ASP Solution Pack are available on its website

www.lotus.com/aspsolutionpack.

ASPs for websites

It's not all about renting office-based applications either. Perhaps you're using a hit counter on your website. Chances are that you've not written it yourself, but have borrowed the code from a third party. Take Netscape's Hitometer for instance (<http://hitometer.netscape.com>), a remotely hosted application that looks like it's running from your own website, but is in fact entirely



NetStore has an innovative Internet backup service

resident and executing on Netscape's servers. Search engines on most websites are also normally operated by ASPs.

Other remotely-hosted web utilities include those from @manage (www.amanage.com), which can remotely monitor every aspect of your URLs and deliver regular performance results – great to see if your web hosting services are up to scratch. Then there's ecommerce services that provide your website with shopping facilities up front, but sort out all the secure credit card transactions remotely without you having to acquire merchant status.

It's your choice

You don't have to use the apps offered by the ASP. Perhaps there's a particular specialised application you need to use, but don't wish to deploy personally. Many ASPs offer dedicated hosting of applications of your own choice.

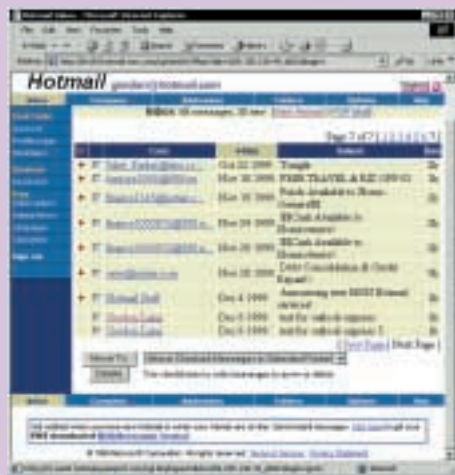
Then there's alternative hosted services that aren't really traditional applications as we know them. How about using an ASP to outsource actual security, such as the often resource-intensive task of maintaining a sophisticated firewall? ESOFTE Global (www.esoft.co.uk) is a European ASP that offers such security services along with traditional application hosting.

NetStore (www.netstore.net), another European ASP, offers hosting of Exchange 2000 Server, but also an innovative Internet backup service. Offsite backing up of data has always been a sensible way of protecting information even if your own offices go up in smoke. But rather than physically posting disks, or making dedicated connections to the secure offsite location, NetStore allows you to back up to its secure servers over the Internet. The beauty of Internet backup is that you can perform the small incremental updates whenever you're online in a matter of seconds. If the worst happens and you lose your data, simply download and reinstall NetStore's 1.1 MB client and access your information once again – it can even post your data on a CD for £49.99 including overnight delivery.

Bet you're already using an ASP!

Believe it or not, we can almost guarantee that you're using an ASP without knowing it. Ever withdrawn money from a cashpoint? Essentially the machine is a thin client accessing a centralised server containing your banking details and the applications required to run the services. Airline ticketing and check-ins work the same way. These are likely to be connected on a private network, but the server-based computing theory remains.

Have you ever used Hotmail? This is a web-based email service



where the application along with all your messages are stored and executed on a remote server accessed over the

Internet by any client device with a browser. This makes Hotmail the most widespread ASP in the world today.

Microsoft's ASP vision

While embroiled in the final stages of the DoJ case, Microsoft announced its next generation of products and services: grouped under the Microsoft.NET banner, they're based on the fact that the majority of Microsoft's apps will, over time, evolve into subscription-based services.

Based on XML, it will allow data and apps to be delivered to a wide variety of devices. XML makes this possible because, unlike HTML, it separates the data from the presentational view, so delivery is device-independent.

Microsoft.NET consists of three sections: the Microsoft.NET platform including .NET infrastructure and tools to build services; the Microsoft.NET products and services, including Win-

dows.NET, MSN.NET, Office.NET, Visual Studio.NET and bCentral for .NET; and finally, third-party .NET services offering corporate and vertical applications built on the .NET platform.

Microsoft will continue to offer and support versions of Windows and Office without .NET services, although only the .NET-enabled ones will enjoy the new online features.

Users who go for the Microsoft.NET platform will enjoy the advantages of ASP services integrated into their MS OS and apps. Expect instant messaging, enhanced personal identities, document collaboration and shared information on multiple devices (using the read/write XML-based Universal Canvas) to be among early features.

The first product to use .NET services is expected to be the next version of Windows 2000, codenamed Whistler, promised in early 2001. Whistler is also expected to offer configurable user interfaces, and may finally wed the 9x and NT/2000 product lines. But we've heard similar claims for merged consumer and corporate OSs from Microsoft for some time.

Back to .NET and one of the most interesting aspects is expected to be bCentral for .NET which will offer subscription-based services and tools for small and growing businesses. These include hosted messaging and email, along with enhanced commerce and customer relationship management

services, which will allow you to track interactions with clients. bCentral already offers great advice to small businesses today, so check it out at www.bcentral.com.

While Windows and Office will continue to be supported outside the .NET platform, Microsoft is keen to move to hosting environments. Over the next three years, it will invest \$2b to allow partners, corporate and independent developers to build Microsoft.NET services. Steve Ballmer, president of Microsoft, has said the company would become an online software service provider within five to seven years. He also forecast that every Independent Software Vendor would be an ASP within a decade.

The big issues

You've heard about the theory behind ASPs, but what about the issues in practice? The biggest fear for all users of ASPs will understandably be that either the ASP's own servers or the link across the Internet fails or even just reduces in speed, rendering them helpless or at least less useful. This is where quality of service comes in.

The reason most ASPs don't list prices on their websites is that they're negotiable depending on the all-important Service Level Agreement (SLA). This is a contract between the ASP and the client, listing guaranteed and understood levels of performance, availability and support for an agreed price.

Clearly the ASPs want to ensure their own network connections are reliable, and many will do so by also being their own ISPs. Conversely many ISPs (particularly those offering broadband connections) will offer application hosting as a value-added service. Whoever is providing your apps and by whatever means, it's essential to agree on an SLA that provides what you require.

Then there's the ownership of data and apps. If one ASP is hosting your customised applications and documents but falls out of favour, just how easy will it be to switch to another provider? Again, the SLA should cover contract periods, renewals and changing providers.

Reduce the hassle

It's certainly an exciting time, where in the near future we could be accessing graphically rich powerful 32bit applications on all manner of

cheap and simple information appliances. We may never have to worry about the pain of upgrading software or hardware to just get at that new killer feature. Mobile workers and owners of multiple devices will easily be able to access their information anywhere.

ASPs are certainly going to be huge and all the analysts agree: IDC believes hosting is set to grow significantly over the next few years, Forrester projects the market for leased applications will reach \$6.4b annually by 2001, and DataQuest reckons it'll hit \$22b by 2003.

As soon as broadband always-on connections make their way into homes and small businesses, a new market of users will be able to enjoy hosted services. Head over to the application service section of ESOFT and download the Citrix ICA client for your device to try out a fully functional Windows 2000 desktop loaded up with Office 2000 and other apps. It's surprisingly usable over a modem, but once on ADSL, it's only fractionally behind the performance of a quick PC.

The local processing power of the PC will, of course, still be necessary for highly demanding applications like desktop publishing, graphics and video editing, but its days could well be numbered for those who mostly use general office applications and email services. Soon end users won't know whether their applications are running locally or remotely, and more importantly, they won't care. Get ready for a hassle-free future.



USING BRAIN WAVES TO SWITCH ON A TV HAS BEEN SCIENCE FICTION – UNTIL NOW

I think, therefore...

HAVE YOU EVER LONGED to have a computer that could read your mind and, for once, do exactly what you wanted it to? New research into a direct brain-computer interface, means that wish might soon come true.

Research into a hands-free brain-computer interface (BCI) has traditionally followed two approaches: biofeedback and stimulus-and-response. With biofeedback, a subject is connected to an electroencephalograph (EEG), and particular groups of brain signals are monitored. One

widely-used signal is the 'mu' rhythm, an 8-12Hz signal centred on the sensorimotor cortex. The

varying amplitude of the signal is used to control a cursor on a computer display.

After a period of training, four out of five subjects can, to some extent, learn

how to make the cursor move – even if they're not

consciously aware of exactly how they're doing it. The problem with

biofeedback is that the training period can stretch to months, and the results can be very variable between subjects and the tasks they try to perform.

The stimulus-and-response technique differs from biofeedback in that when a subject is given a certain stimulus, the brain will automatically produce a measurable response – so there's no need to train the subject to manipulate specific brain waves.

One signal, the 'P300 evoked potential', is ideal for this approach. First discovered in 1965, the P300 signal is the signature of the rush of neural activity that occurs about 300 milliseconds after a subject notices an

external stimulus that they've been asked to watch out for.

At the University of Rochester in New York, researcher Jessica Bayliss is using the P300 signal to let people control objects in a virtual 3D world (www.cs.rochester.edu/u/bayliss/). Subjects in her experiments wear a skull-cap instrumented with 27 EEG sensors. On top of the cap the subject dons a pair of standard VR goggles, which provide a view of a computer-generated 3D world. In this simple world there's a table lamp, a stereo system and a TV. Above each object there's a flashing light. Each of the lights flashes at its own rate, and out of sync with the others. If the subject wants to switch on any of the objects, they simply think about which object they're interested in, and the P300 signal does the rest.

Suppose the subject wishes to switch the TV on. Whenever the light above it flashes on, the brain recognises the correspondence between 'the light is on' and 'I want to switch the TV on', and 300ms later generates a P300 signal. Bayliss' system automatically compares any P300 traces recorded on the EEG with the states of the flashing lights. If any are found to be in sync – such that one of the lights flashes on followed 300ms later by a P300 signal – then the system knows which object the subject was thinking of, and can switch the object on in the virtual world. In effect, the subject has communicated a 'yes/no' decision entirely by thinking, and it works about 85 per cent of the time.

What makes these experiments significant is that picking up the brain's electrical activity is fraught with problems. The signals are tiny, no more than a few millionths of a volt, so they're easily swamped by any stray electromagnetic noise in the environment. Most BCI experiments are therefore done in carefully shielded laboratories. Bayliss' achievement is to have found a way to clearly measure the signals in a very electrically noisy place – a virtual reality laboratory stuffed with computers, displays and tracking devices.

The work of Bayliss and others is paving the way for BCI-enabled consumer products. In the future you'll be able to control your ear-implanted phone/MP3 player just by thinking about it. Minds will soon be boggling, and presumably so will any machines they happen to be controlling.

TOBY HOWARD



ILLUSTRATION BILL 'STIK' GREENHEAD

PROJECTS LIKE SETI@HOME PAVED THE WAY FOR OTHER USES OF PCS' SPARE CAPACITY

Jobs for lazy PCs

OUR PCS ARE SURPRISINGLY lazy things. If you run a system monitor program, like Microsoft's WinTop, and carry on with your usual work (or play), it's amazing to see how little processing power many common tasks actually take. Stop for a breather, and suddenly your machine may be 97 per cent idle. What if you could share, or even sell, your PC's spare capacity? Well, if you have an Internet connection, you already can.

The idea of using the Internet to harness unused PC power has become known as 'distributed computing', and first became news in 1996 with the GIMPS project, which searched for the largest prime numbers (www.mersenne.org).

This was quickly followed by the incredible success story of SETI@home, which analyses radio-telescope data for signals from extra-terrestrial life (<http://setiathome.berkeley.edu>).

SETI@home works on data from the Arecibo telescope in Puerto Rico, which daily sends 50GB of data to the SETI@home lab in Berkeley, California. The raw data is chopped into manageable chunks, and distributed to screensavers running on co-operating PCs around the world. Nearly 60 million chunks have been farmed out for checking, but no extraterrestrial signal has been found – yet. The project has the support of two million people in 226 countries, and has clocked up an amazing 285,000 years of computer time.

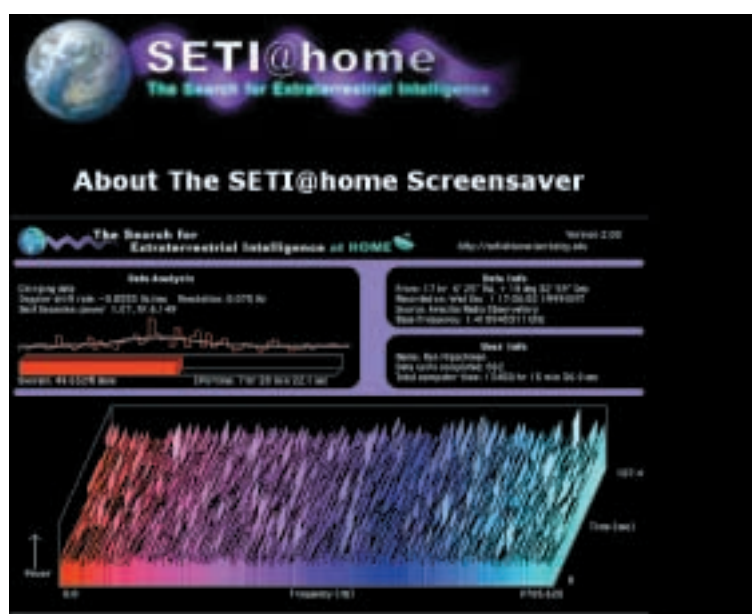
In the UK, Myles Allen of the Rutherford Appleton Laboratory is organising the 'Casino-21' project, which will use distributed computing for simulating changes in the earth's climate. The project isn't yet operational, but you can register your interest now at www.climate-dynamics.rl.ac.uk. Beware though, this isn't a simulation for the faint-hearted: 'It calls for you to install a unique, state-of-the-art climate model on your home PC and keep it running, possibly for a year or more,' said Allen.

Until recently, distributed computing has been a strictly non-commercial activity. But now people are beginning to see how to exploit the idea to make money. If there's a huge pool of unused processor power out there, and if companies can exploit that power to solve their problems, there's a natural role for a broker.

One such go-between is Popular Power, which intends to handle both non-profit-making and commercial applications (www.popularpower.com). Its first project is to simulate the response of human antibodies to

influenza vaccines. With subsequent commercial projects, Popular Power intends to pay those who contribute their spare PC cycles.

Parabon Computation of Fairfax, Virginia, has just announced a pilot scheme in collaboration with the US National Cancer Institute (www.nci.nih.gov). They aim to use distributed computing to analyse the complex data from



experiments with anti-cancer drugs and their effects on gene expression in cells. Currently, such research is hindered by the enormous computing times – sometimes months – required to analyse the data. With a distributed approach, Parabon hopes to reduce the work to a matter of days (www.parabon.com).

There are limitations to what distributed computing can achieve. In particular, it only works if a problem can be solved by breaking it into a lot of simpler sub-problems, each of which can be solved separately. Problems that require a step-by-step approach to the solution just aren't amenable.

And there are security issues: how can a company be sure its computation on your PC isn't being compromised by a rival company? And how can you be sure that your climate modelling screensaver isn't doing something unpleasant to your PC while you're asleep?

There will be solutions to these problems, and the prospects of distributed computing are exciting. Our lazy PCs may even end up doing something useful.

TOBY HOWARD

Two million people are using spare processing power to find out if there is any extraterrestrial life

Media

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• PCs reviewed by Jalal Werfalli and Richard McPartland, tested by Jalal Werfalli

junkies

As Microsoft flexes its multimedia muscles with the general release of Windows Millennium Edition, we challenged 11 manufacturers to put together a PC that makes the most of the extra features

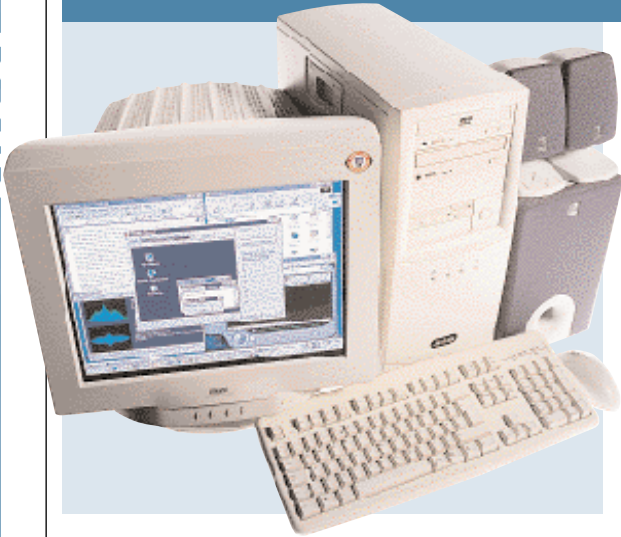
More than five years have passed since Microsoft first introduced the Windows 9x family to the home consumer. No-one could dispute the fact that Windows 95 was a major improvement, presenting us with a whole host of new features – the most significant being plug-and-play – allowing the operating system itself to take care of identifying, installing and configuring new add-on devices with little or no user intervention – in theory, at least. Five years on and the latest incarnation of Microsoft's consumer OS is now upon us – Windows ME (Millennium Edition).

Although much of ME's new content can be downloaded for free from the Microsoft website, it does nonetheless contain some worthwhile enhancements over its predecessors. Microsoft has concentrated its efforts into redesigning multimedia elements such as the Media Player while also bringing us new features – the Movie Maker applet and home networking facilities to name just two.

With Windows ME now on general release, we asked 11 manufacturers to put together a functional home PC with the new OS pre-installed. We set the minimum spec as 128MB of memory, a 10GB hard drive, a 17in monitor and sound, along with speakers and video-in/out functionality to make use of Movie Maker and the enhanced Media Player. With home users in mind, we set an upper price limit of £999 ex VAT but including delivery to mainland UK, any credit card surcharge and a three-year, parts and labour warranty. So, given this fairly common spec, what did the manufacturers think would bring out the best of Windows ME?

PHOTOGRAPH DAVID WHYTE

Atlas Meridian A800T ME



THE 800MHZ ATHLON-BASED Atlas Meridian A800T ME has combined speed with a well-thought-out feature set, meeting our requirements head on. To cater for video-in-and-out functionality the Atlas comes with a Prolink TV-tuner card that not only serves as a means for transferring media files to and from your capture/playback device, but can also receive a TV signal.

Inside the chassis the Athlon processor is fitted to an Asus A7V

motherboard based on VIA's KT133 chipset. This is capable of supporting 1GHz processors and features an AMD-standard 200MHz front-side bus (FSB), which in this case is augmented by 128MB of PC133 SDRAM. Storage is adequately dealt with by a 15.3GB IBM hard drive, while a Teac CD-RW drive sits in one of the three 5.25in bays. For movie playback there's also an eight-speed DVD-ROM drive.

For expansion purposes there is one remaining free PCI slot and one PCI/AMR shared slot. In addition to the two standard USB ports on the motherboard, a backing plate containing a further three USB ports is included for optional internal connection to the motherboard. Two of the PCI slots contain a budget Creative Audio PCI sound card and a Diamond SupraSST modem. A sub-woofer and two speakers come courtesy of ProMedia.

On the graphics front, a Hercules 3D Prophet II MX card is plugged into the AGP slot and comes with 32MB of SDRAM. This MX card performs very well, lifting the Atlas Meridian into the top spot for SYSmark, and into second and third place for the 3DMark and Quake III tests respectively. The system's 17in CTX PR705FT monitor has a vibrant FD Trinitron flat-screen display. A copy of Lotus SmartSuite Millennium is also bundled.

All in all the Atlas gets a thumbs up in every department and strikes a good balance between price, performance and features. As a result, the Atlas receives the Editor's Choice award.

DETAILS

PRICE £1,173.83 (£999 ex VAT)

CONTACT Atlas 0700 285 275

www.atlasplc.com

PROS Excellent graphics performance; CD-RW; quality monitor

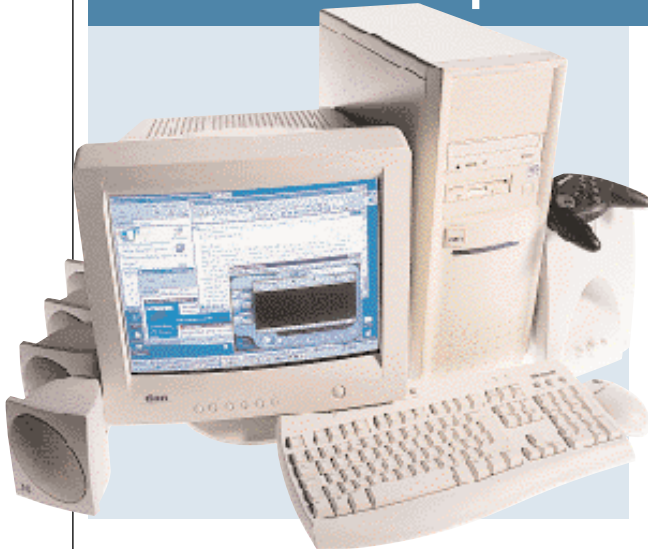
CONS Minimal software

OVERALL An excellent component combination makes this a worthy Windows Millennium Edition PC

FEATURES	★★★★
PERFORMANCE	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★



Dan Ultimate Special Edition



THIS IS THE MOST expensive system in the group, coming in at £1,049 ex VAT, £50 over our budget. Having said that, the specification does comply with all the criteria we set.

For full video-in-and-out capability Dan has included ATI's All-in-Wonder 128 graphics solution, sporting 32MB of memory. The PC also comes with a good selection of cables that allow you to connect camcorders for use with the Windows ME Movie Maker. If

you want to watch DVDs you'll not be disappointed either, as this card has a good reputation for DVD playback, so it complements the Hitachi eight-speed DVD rather well. It also sports a built-in TV tuner.

When it comes to 3D performance, the ATI is not the swiftest of cards, turning in a mediocre 1,117 3DMarks at 1,280 x 1,024 with 16bit colour. This puts it ahead of the Elonex WebRider, which also uses an ATI All-in-

Wonder, even though it's running a full 100MHz slower. We put this hiked performance down to the fact that Dan is using newer ATI drivers. The monitor, a CTX Value Line VL700, displayed less than impressive image quality, but did support a flicker-free refresh of 75Hz at 1,152 x 864.

Inside the rather bland midi tower is a jumperless Asus CUV4X motherboard capable of supporting either a 133 or 100MHz FSB, although this is limited by

the single 128MB DIMM of PC100 RAM. It hosts a 700MHz PIII and comes with onboard sound chips, but Dan has opted to supplement these by using Creative's SoundBlaster Live! 1024. A standard 56K PCI modem takes care of Internet connectivity, but if you have any ISA cards or an AMR card these could be blocked by the second COM port that occupies the ISA/AMR case slot.

Overall, the Dan Ultimate Special Edition is a reasonable machine that is well-rounded and fulfils the group test criteria. It is a little over budget and if top games performance is your vice then other machines may be a better choice.

DETAILS

PRICE £1,232.58 (£1,049 ex VAT)

CONTACT Dan Technology 020 8830 1100

www.dan.co.uk

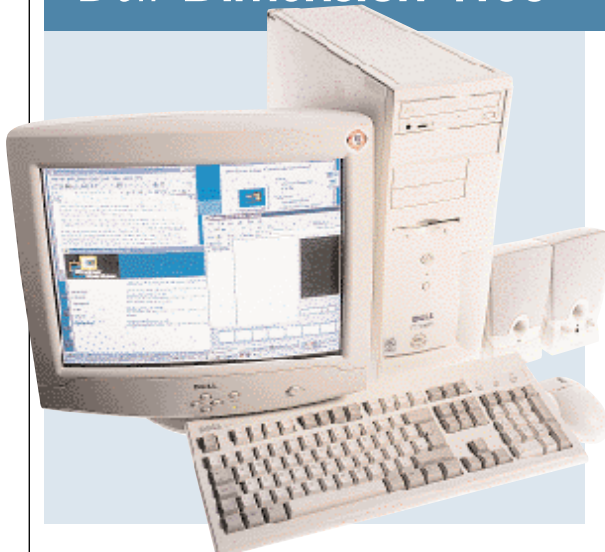
PROS Good DVD playback; TV tuner

CONS Price; 3D performance; uninspiring monitor; no CD-RW

OVERALL Although the system offers a range of multimedia options, it needs a CD-RW and is a bit over-priced

FEATURES	★★★
PERFORMANCE	★★★
VALUE FOR MONEY	★★
OVERALL RATING	★★★

Dell Dimension 4100



DELL'S MACHINE covers most video-editing bases with a good mix of quality components. It has an 800MHz Pentium III processor at its core backed by 128MB of 133MHz SDRAM and earned itself a healthy, though not dazzling, score of 137 in SYSmark 2000.

Ignoring the onboard graphics of the 815E motherboard, this system really excels when it comes to 3D performance. Just as well if you're after a PC up to the task of editing home

movies and the ability to play 3D games. It achieved the highest score of all our PCs in 3DMark 2000 and trounced the other systems in our 16bit Quake III test with a score of 77.7fps. Its nearest rival, the Polar, could only muster 48.3fps. It's hardly surprising to find that Dell has ignored the onboard graphics, instead opting for a 32MB Dell-branded card based on nVidia's GeForce2 GTS chipset. However, no video-in/out ports are available and so

Dell, like Mesh, has included a FireWire (IEEE 1394) host card with three ports. This card enables the digital-video enthusiast to quickly transfer files to be assembled in Windows ME's Movie Maker. It also means the PC is ready for the next generation of peripherals.

The monitor, a 17in Dell E770p, is a fair performer with a well-focused shadow-mask screen, capable of a sturdy 1,024 x 768, although there was a certain graininess to the image.

A SoundBlaster Live! 1024 card is coupled with some Harmon Kardon speakers. Although the 20.4GB Western Digital hard drive is not the most spacious compared to some of the other machines it should be more than adequate for the tasks at hand.

Unfortunately, there's no removable storage device, which we would have expected to see from Dell. Having said that, this is one of the less expensive PCs in the group test so you could put the £50 saving towards a CD-RW drive. Bundled copies of Microsoft Works Suite 2000 and MGI's VideoWaveIII round off the package.

DETAILS

PRICE £1,105 (£949 ex VAT)

CONTACT Dell Computers
0870 907 5664, www.dell.co.uk

PROS The fastest 3D graphics performer; FireWire ports; cheaper than most

CONS No backup devices

OVERALL A good value PC despite the expensive graphics card. If Dell had included a CD-RW it would have been on a level footing with the winner

FEATURES

PERFORMANCE

VALUE FOR MONEY

OVERALL RATING



★★★★
★★★★★
★★★★
★★★★

Elonex WebRider



ELONEX HAS OPTED for an 800MHz Pentium III this month, which helps this WebRider power its way to second place in the SYSmark results table with a score of 147. Filling one of the two DIMM slots on the MSI 6323 micro ATX motherboard is 128MB of PC133 SDRAM. Storage is adequately taken care of by a 27.3GB Fujitsu hard disk, while the Acer 16-speed DVD-ROM drive caters for video playback and loading applications.

Looking inside the case we found that Elonex had delivered its machine to us without a modem. It has assured us that the final retail version will ship with one, from MSI, fitted to the Audio Modem Riser (AMR) slot. The onboard sound means that both PCI slots are free, leaving room for future expansion.

An ATI All-in-Wonder 128 takes care of the graphics and its disappointing performance in this instance is highlighted

by the WebRider's poor results in the 3DMark and Quake III tests. However, multimedia functionality is of greater importance than speed in this group test and the ATI card doesn't disappoint in that respect. Video-in/out is included, as well as a TV tuner with Teletext and hardware support for DVD playback.

Unfortunately, the Elonex-branded monitor is not up to the same standard as some of the other screens in this

group test, which is a shame given the ATI's DVD capabilities.

As far as input devices go, the WebRider comes with a Microsoft IntelliMouse, and an NMB keyboard, while a minimal software bundle includes a copy of Ulead VideoStudio SE.

The Elonex WebRider is not the best system in this month's test and serious gamers are better off looking elsewhere. Despite the impressive SYSmark result and the good all-round capabilities of the graphics card, the poor 3D performance and below-par monitor let the system down.

DETAILS

PRICE £1,145.62 (£975 ex VAT)

CONTACT Elonex 020 8452 4444
www.elonex.co.uk

PROS 800MHz processor; good DVD playback

CONS Poor 3D performance; uninspiring monitor

OVERALL A top-notch processor but there are better all-round systems on offer in this month's group test

FEATURES

PERFORMANCE

VALUE FOR MONEY

OVERALL RATING

★★★★
★★★★
★★★★
★★★★



evesham.com Origin 750E



EVEHAM.COM HAS opted for an Athlon processor for its Origin and, as the name suggests, this AMD chip is running at 750MHz. The Athlon is plugged into the socket of a K7Z Pro motherboard from MSI, more commonly known as the K7T. Based on VIA's KT133 chipset, it supports both PC100 and PC133 memory. Thankfully, evesham.com has opted for a single 128MB PC133 module, leaving two slots free for upgrade.

One of the PCI slots is occupied by a Diamond V.90 modem and sound is produced by the onboard VIA audio controller and a set of Creative speakers.

In the AGP slot is an ATI Rage 128 Pro graphics card, which comes fully equipped with video-in/out and DVD motion compensation. Although not as fast as the latest GeForce-powered cards, the ATI is still capable of running all but the most demanding of games.

Curiously, it appears that the driver used by evesham.com is one designed for the All-in-Wonder 128 Pro, perhaps partially explaining the difference in scores when compared to the Systemax machine that uses the same card.

With a Quake III score of 20.2fps and 1,459 3DMarks, the 128 Pro is perfectly adequate for the machine's intended use. However, the display on the 17in ValueVision Taxan monitor does not look as good as some of the

others on test here, and is of a similar quality to the Dell monitor. A decent-sized 20.4GB Maxtor hard disk and a Samsung DVD/CD-RW combo drive take care of storage, which is essential if you find yourself editing video or music.

As far as software goes, there's Microsoft Works Suite 2000, which covers most home users' needs and ensures maximum compatibility with other office suites.

On the whole, evesham.com has put together a package that performs adequately in most areas. However the monitor doesn't do the system justice and PC performance is not the best.

DETAILS

PRICE £1,173.83 (£999 ex VAT)

CONTACT evesham.com 0800 038 0800

www.evesham.com

PROS Good overall package; MS Works Suite 2000

CONS Only has onboard sound, which some may find irritating

OVERALL A decent effort that's eclipsed by the competition

FEATURES	★★★
PERFORMANCE	★★★
VALUE FOR MONEY	★★★
OVERALL RATING	★★★

Mesh Matrix Fire850



MESH IS ONE of two manufacturers this month that have chosen to power their machines with the 850MHz Slot A Athlon processor. With 128MB of PC100 SDRAM in the Gigabyte GA71XE motherboard, this processor helps the Matrix Fire850 achieve a very respectable score of 145 in the SYSmark tests, placing it third overall. The Gigabyte motherboard is based on AMD's new 751/756 chipset that, unlike the VIA-based motherboards in

this test, does not support PC133 SDRAM.

Sitting in the AGP slot is the 3D Prophet SE GeForce 256 Card with 32MB of SDRAM. A point worth mentioning is that the 2x AGP slot on the Gigabyte motherboard cannot take full advantage of the very latest 4x AGP graphics cards. Nevertheless, the Matrix Fire850 still scores a reasonable 1,921 3DMarks and manages 34.9fps in the Quake III tests.

Hooked up to the 3D Prophet SE is the Sony CDP-E200E monitor. Based on Sony's own aperture-grille technology, it's certainly one of the better 17in displays in the test. Apart from the standard D-SUB, the 3D Prophet SE doesn't come equipped with any additional video inputs or outputs. However, Mesh has allowed for this and supplied its system with a FireWire (IEEE 1394) card. Most likely to appeal to digital camcorder users, the FireWire ports will support fast data transfer

rates of up to 400Mbps/sec. Filling two more PCI slots in the Mesh system are a Diamond 56K modem and a SoundBlaster Live! 1024 sound card.

In terms of storage, the Matrix Fire850 is fitted with a roomy 30.7GB Maxtor hard disk and a 16-speed Pioneer DVD-ROM. However, the Fire850 lacks any form of backup device. Mesh also includes Microsoft Works Suite 2000 for office duties.

Overall, Mesh has put together a top-quality machine that does a good job of fulfilling the test criteria. The addition of a FireWire card will certainly interest digital camcorder users.

DETAILS

PRICE £1,173.83 (£999 ex VAT)

CONTACT Mesh Computers 020 8208 4706

www.meshcomputers.com

PROS Good-quality components; FireWire card; decent performance

CONS No backup device; no analog video-in/out

OVERALL A good all-rounder with a quality set of components, but the lack of removable storage just nudges it behind the winners

FEATURES	★★★
PERFORMANCE	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

Multivision Vision Elite A800 Video



MULTIVISION'S PC comes with the new, socketed 800MHz Athlon processor, which is backed by 128MB of 133MHz SDRAM. The EPoX motherboard also has four spare PCI slots, so there's plenty of room for expansion in the future. This healthy specification helped the machine to a fair 139 in our overall SYSmark test.

Unfortunately, if you're a hardcore gamer you'll find the system not quite up to scratch as it only scored 996 in

3DMark 2000 and 15.8fps in Quake III. However, this is not the intended purpose of the machine and the 32MB Guillemot Cougar Video Edition card, based on the nVidia Riva TNT2 M64 chipset, fulfils the VIVO (video in, video out) requirements very well. S-Video and composite ports handle input, while TV-out (composite and S-Video) allows you to send your videos to a VCR or camcorder and display them on a TV. The Cougar is bundled with

Ulead VideoStudio SE for editing video. The monitor, a 17in LG Flatron, has minimal reflectivity, a sharp vibrant image and is capable of displaying flicker-free resolutions up to 1,024 x 768 at 85Hz.

Sound capabilities are handled by an onboard chip rather than a separate card. The latter would be a much better bet if you plan to construct a soundtrack for your edited home movies, but it's no major criticism.

The hard disk is a cavernous 30.6GB Seagate model and should prove more than adequate even if you make extensive use of Windows ME's Movie Maker software. When it comes to removable storage, the Vision Elite has it covered with a four-speed CD-RW drive from Teac.

Inside the box you'll find copies of Lotus SmartSuite Millennium and IBM's ViaVoice. A headset and microphone are bundled and the Internet keyboard and IntelliMouse from Microsoft are both as good as they come. There is also an impressive five-year warranty that sets this system apart from the crowd.

DETAILS

PRICE £1,115.08 (£949 ex VAT)

CONTACT Multivision
0121 550 8000 www.multivision.co.uk

PROS Excellent value; CD-RW for removable storage; decent monitor

CONS A dedicated sound card would have been better; poor graphics card

OVERALL A machine that combines all the important features into a great value package only let down by the graphics card

FEATURES

PERFORMANCE

VALUE FOR MONEY

OVERALL RATING

★★★★

★★★★

★★★★★

★★★★

Panrix Nitro 700



PANRIX HAS SUPPLIED a well-balanced machine using AMD's 700MHz Duron. Housed in an Asus motherboard utilising VIA's popular KT133 chipset, the processor is complemented by a single 128MB PC133 SDRAM module, which leaves two DIMM slots free for future memory upgrades. A modest 15.3GB IBM hard disk is provided as the main storage solution, which seems a little on the small side but should be adequate for

most users. Thankfully, Panrix has also fitted the Nitro 700 with a removable storage device in the form of a 250MB Iomega ZIP drive, although we would have preferred a CD-RW. A 10-speed Pioneer DVD-ROM drive is also included.

Panrix has sensibly opted to include three extra USB ports at the rear of the case by mounting them in one of the backing plates. This allows up to five USB devices to be connected to the PC without the

need for a separate USB hub – power requirements permitting.

Sitting in the AGP slot is an Asus V6600 Deluxe graphics card. Powered by the nVidia GeForce 256 chipset, the Asus has video-in and out, which will be put to good use by Windows ME. This card uses single data rate memory, which is reflected in the 3D scores compared with the double data rate (DDR) Asus V6800 card inside Polar's PC.

Hooked up to the V6600 is a

Mitsubishi Diamond Plus73 monitor – a budget 17in model based on Mitsubishi's Diamondtron NF tube.

The screen we were sent suffered from poor power regulation, resulting in variable image sizes. Filling two of the PCI slots are a Diamond SupraExpress 56K modem and a SoundBlaster Live! Value 1024 card.

Panrix has made Microsoft Works its choice of office software, which we feel is a little stingy, as we'd like to have seen Works Suite at least.

With an overall SYSmark score of 130, the Nitro is lagging behind most of the other PCs in this month's group test. Although it is a decent package, better value systems can be found elsewhere.

DETAILS

PRICE £1,173.83 (£999 ex VAT)

CONTACT Panrix 0113 244 4958
www.panrix.com

PROS Good set of features; good connectivity

CONS No CD-RW; average monitor

OVERALL The Panrix is a decent enough PC but there are better value systems in the test

FEATURES

PERFORMANCE

VALUE FOR MONEY

OVERALL RATING

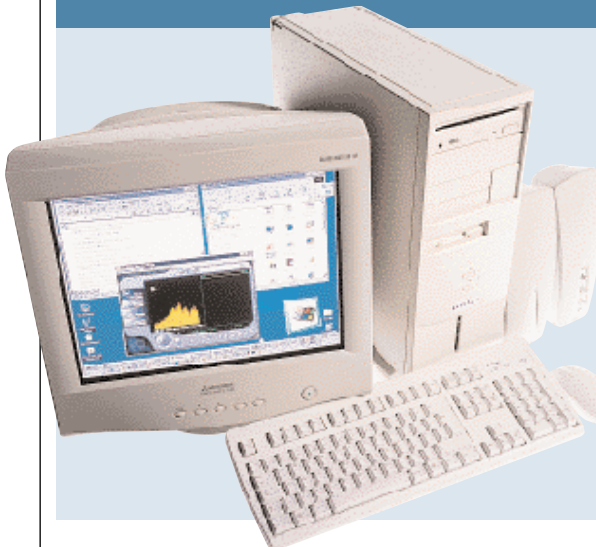
★★★★

★★★★

★★★★

★★★

Polar Premier 850



THERE'S AN 850MHz Athlon chip driving Polar's offering, which makes it one of the fastest clocked machines on test. Even though this AMD processor is of the older Slot A variety, it is backed up by a healthy 128MB of RAM. Unfortunately, the memory is of the slower 100MHz type, as the supplied Gigabyte motherboard does not support memory speeds of over 100MHz. Nevertheless, like most of the PCs we looked at there are two free

is a decent choice, as its 3DMark score of 3,093 bears out. This was third fastest and when we ran our Quake III demo at 1,280 x 1,024 in 16bit colour the Polar managed to notch up 48.3fps placing it second only to the Dell that comes with a card based on the GeForce2 chipset.

When it comes to storage the 30.7GB IBM Deskstar hard drive means that you'll have more than enough space for video capture and editing purposes.

DIMM slots should you decide to beef up your system in the coming months and the existing SDRAM module could always be swapped out if necessary. The Polar turned in a respectable overall SYSmark score of 142 ranking it fourth in the line-up.

Graphics are handled by a 32MB Asus V6800 Deluxe card, which is based on nVidia's GeForce 256 chipset and comes with video-in/out connectors. It uses DDR memory and

However, unlike the Panrix there is no removable storage device, which is important for transporting those media files. Elsewhere there's a slot-loading 10-speed DVD-ROM drive from Pioneer.

The Premier 850 also ships with a 17in Diamond Pro 720 monitor from Mitsubishi is capable of displaying a flicker-free image at resolutions up to 1,600 x 1,200.

Creative's SoundBlaster Live! 1024 card is a popular choice for PC audio and features in no fewer than five of our test PCs including this one. This time it's backed by Labtec speakers.

DETAILS

PRICE £1,173.83 (£999 ex VAT)

CONTACT Polar Technology 0800 138 1238

www.polartechnology.com

PROS Excellent graphics capabilities; decent monitor; large hard drive

CONS No removable storage or extra software

OVERALL An excellent machine that performed very well and fitted most of the criteria we set out, but was pipped by those offering a backup device and more software

FEATURES

PERFORMANCE

VALUE FOR MONEY

OVERALL RATING

★★★

★★★★

★★★★

★★★★

Windows ME's multimedia features

Three aspects of Windows ME's digital media features are generating all the excitement: the new version 7 of Windows Media Player, support for capture and organisation of still pictures from digital cameras and, saving the best for last, Windows Movie Maker – a basic video-capture and editing application.

Version 7 of Media Player adds several new formats to its repertoire including new video formats, CD audio and MP3. It downloads track info from the web and can RIP tracks into Microsoft's new WMA audio format, which can store one hour of digital audio in 50MB of hard-drive space.

Digital camera users will be familiar with downloading images onto their PC's hard disk and using software like Cumulus SE, Soap, or a media manager utility provided with image-editing software to organise, retrieve and display digital photos.

Windows ME provides all of these functions through its WIA (Windows Image Acquisition) technology. A control-panel wizard takes you through the process of setting up your digital camera then, when you plug it in, the device appears as an icon within 'My Computer' or Windows Explorer.

Each image is displayed with a thumbnail view, so you can decide which you want to store on your hard drive. Pictures can be rotated and directly printed and you can start a slideshow comprising all the files in the folder.

Windows Movie Maker is a basic video-capture and editing application that provides tools to edit, save and share video clips. To capture video from an analog or digital camcorder you'll need appropriate hardware – an analog video-capture card or IEEE 1394 board for hooking up your DV camcorder.

Movie Maker uses

Microsoft's .asf video format that, according to Microsoft, can store more than 20 hours of digital video in 1GB of hard-drive space. Given the same disk space, DV manages around four and a half minutes, so that's impressive compression and it makes storing your entire year's worth of home video on a hard drive or CD a practical proposition. At that compression ratio, however, the quality (which Microsoft describes as 'medium') is unlikely to be spectacular.

When you save a Movie Maker file the application scans the footage, recognises break points where you stopped and restarted recording, and breaks the file into separate clips. You can then drag the clips and rearrange them on the storyboard, leaving out the clips that you don't want to include. Editing effects are limited and include adding

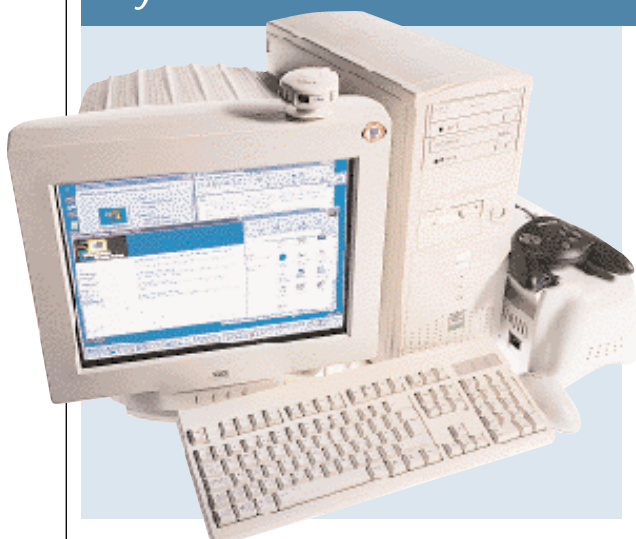
audio and simple fade-in fade-out transitions.

There's no denying that it's all great stuff. If you're using a digital camera or a camcorder an upgrade to ME is a must. To take a cynical view, what ME offers has been around for a good while already. Microsoft is doing what it has always done – looking at what other software developers succeed with and adding it to Windows.

If you own a digital camera the chances are you already have an image-editing application that offers far superior features than anything ME provides. Likewise, if you want to get your camcorder footage onto the PC, even with ME you'll need a capture card and in all probability it will be bundled with Adobe Premiere LE, Ulead Video Studio 4 or MGI VideoWave III – all light years ahead of ME in the video-editing universe.

KEN MCMAHON

Systemax D650RV Work & Play



opted to include 128MB of PC133 memory in the form of a single DIMM module, leaving two slots free for future upgrades.

Four PCI slots and one shared are on offer, although one of these is occupied by Simply's own-brand 56K modem. Sound is provided by way of an onboard Creative audio controller and is piped through to a set of Creative speakers. An ATI Rage 128 Pro VIVO graphics adaptor sits in the AGP slot equipped with video-in/out as

SYSTEMAX HAS OPTED for a 650MHz Duron processor for its entry this month. In terms of performance, this machine was a little lacking, coming bottom overall in the SYSmark results. The Duron simply can't compete with the higher-clocked Pentium III and Athlon processors supplied by other manufacturers. The Biostar motherboard is yet another design featured in this month's test that utilises VIA's KT133 chipset. Systemax has sensibly

well as hardware support for DVD playback. The CTX PR705F monitor is one of the better models in the test, providing good overall image quality for all-round use.

A massive 30.7GB Maxtor hard disk and Ricoh DVD-ROM/CD-RW combo drive are supplied as the primary means of data storage. The inclusion of a combo drive in place of separate DVD-ROM and CD-RW drives usually means you won't be able to make direct copies

from CD. However, Systemax has kept this in mind and included a separate 52-speed CD-ROM as well.

The Systemax comes with a variety of extra peripherals, including a Microsoft Sidewinder joystick and an Intel webcam. This is the only system this month to include a printer. Although it may not be the best colour inkjet available, the inclusion of an Epson Stylus 480 can only add more value to the overall package. Lotus SmartSuite Millennium is also bundled allowing you to be productive from day one.

If a full set of features comes higher on your list of requirements than a super-fast machine then you could do a lot worse than this.

DETAILS

PRICE £1,173.83 (£999 ex VAT)

CONTACT Simply 08707 297 366

www.simply.co.uk

PROS Great features; printer included

CONS Slowest processor in the group

OVERALL A great all-round package that's just beaten by the PCs with similar features and beefier processors

FEATURES	★★★★
PERFORMANCE	★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

Viglen HomePro P3-700NWR



processor to a 733 Pentium III. This makes the whole package better value for money, but we would have preferred some form of removable storage option for backing up or transporting media productions.

Plugged into the primary EIDE channel is a 20.4GB Western Digital hard drive that, although not the biggest, should be adequate for storing a reasonably sized digital library.

The motherboard comes with onboard sound but Viglen has disabled this and included a standard Creative Audio PCI card to take care of sound reproduction. This is connected to Altec Lansing stereo speakers. In addition, there is only one COM port on the motherboard.

Inside, the cabling is the tidiest in the group test, neatly routed away from the motherboard to allow easy access to the slots and components.

Graphics are handled by an ATI Rage

VIGLEN'S HOMEPRO is a full £50 cheaper than the next best priced PC at £899. For the money, you get an Intel 815E motherboard sporting a 700MHz Pentium III processor, supported by 128MB of 133MHz SDRAM. In this configuration the SYSmark scores were pretty much average, with the Viglen achieving a score of 135. However, Viglen has told us that by the time you read this you will be able to upgrade the

128 Pro with VIVO – a good solution for the criteria we set – and with a 3DMark score of 1,568, it is on a par Systemax's machine using the same card. Wired up to this is a Viglen-badged shadow-mask monitor which was reasonably focused across its screen but not as flat as some of the aperture-grille models here.

Like many of the other contenders the Viglen would have been a much better buy if it had included some form of removable storage so you could back up or transport your media files. The fact that other machines included a CD-RW means that the Viglen can't quite compete.

DETAILS

PRICE £1,056.33 (£899 ex VAT)

CONTACT Viglen 020 8758 7000

www.viglen.co.uk

PROS Good price and promise of a processor upgrade; neat build

CONS No removable storage; single COM port

OVERALL A good value machine that falls behind the leaders because it doesn't have a removable storage device

FEATURES	★★★★
PERFORMANCE	★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★





How we did the tests

SYSmark 2000

This comprises 12 application workloads and a management program. The workloads are divided into two categories: office productivity and Internet content creation. We run the benchmark at a resolution of 1,024 x 768 in 16bit colour. It loops three times, rebooting between each workload.

It then assigns the system a performance rating for each application, based on a comparison of workload runtimes between the system being tested and a fixed calibration platform. A rating of 100 indicates the test system has performance equal to that of the calibration platform, 200 indicates twice the performance and so on. The calibration platform is based on a Pentium III 450MHz processor, an Intel 440BX chipset motherboard, 128MB of SDRAM, a 32MB Diamond Viper V770 Ultra graphics card, an IBM DJNA 371800 and Windows 98 SE.

Each category rating is a geometric mean of the workload ratings in that category. The overall rating is a weighted geometric mean of the category ratings.

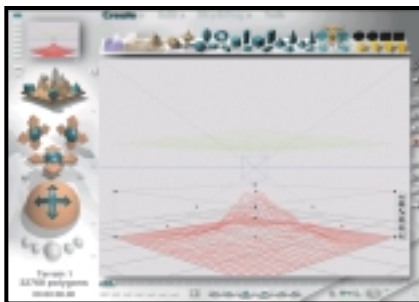
Office productivity

Corel CorelDraw 9.0

This script first takes an abstract design, applies an Art Stroke to it and runs various filter effects. It creates and manipulates a scene composed of vector graphics. Next, it takes a raster image and applies effects. It creates several 3D objects and performs 3D manipulations.

Corel Paradox 9.0

This performs SQL-style queries on a database table and runs a 'find duplicates' query. It imports other text files, formatting and exporting each to HTML. Then it opens up query forms, enters



Bryce 4 script manipulates a wire frame scene and renders it

charts, applying graphics and sound effects, and adding movie files.

additional data and produces reports based on queries.

Microsoft Word 2000

This workload invokes word processing functions, including editing, spell checking, search and replace, font change, copy and paste, print preview, mail merge fields, insert hyperlinks, background and table formatting plus opening and viewing HTML pages.

Microsoft Excel 2000

Operations include closing and opening spreadsheets, HTML pages and data in text files, spell checks, formula calculation, plotting data, formatting charts and cells, analysing data in pivot tables, naming a cell and inserting hyperlinks.

Microsoft PowerPoint 2000

Operations include spell checks, editing, formatting and moving pictures, applying templates, formatting tables in slides, inserting hyperlinks, applying header and footer data, formatting

3DMark 2000 tests each system's DirectX performance (above) and OpenGL performance is tested via Quake III: Arena (right)

Dragon NaturallySpeaking Preferred 4.0

The script plays a pre-recorded wav file into NaturallySpeaking, which then converts the wav file to text.

Netscape

Communicator 4.61

This opens a website of plays by Shakespeare and selects and loads the texts several times. Then it loads a page consisting of large tables, thumbnails and images and cycles through viewing the images.

Internet content creation

Adobe Premiere 5.1

This creates an animation of about 16 bmp files and other avi clips and puts transitions between them. It superimposes two audio tracks and runs the audio through filters.



Adobe Photoshop 5.5

The script loads, resizes, zooms out of images, applies filters to the images, changes mode and colour settings, adjusts image brightness and contrast and saves the image to a jpeg file.

Avid Elastic Reality 3.1

The workload sets up and renders a morph between two mpeg2-sized images (720 x 480 pixels, roughly 750KB).

MetaCreations Bryce 4

This script opens an assembled wire frame scene and renders it to the final image. Then a new image is opened and saved in Metastream format. Another image is opened and saved in an HTML-compatible format.

Microsoft Windows Media Encoder 4.0

The input file is an avi clip that is encoded using the mpeg4 Video Codec.

3DMark 2000

Remedy Entertainment's MAX-FX is used to test the DirectX performance of a system. It runs two specially coded games at low, medium and high resolutions. We ran the benchmark at 1,280 x 1,024 in 16bit colour, with each game set to loop three times. The 3DMark is calculated by adding the frames per second for each game together and multiplying the result by 12.

Quake III

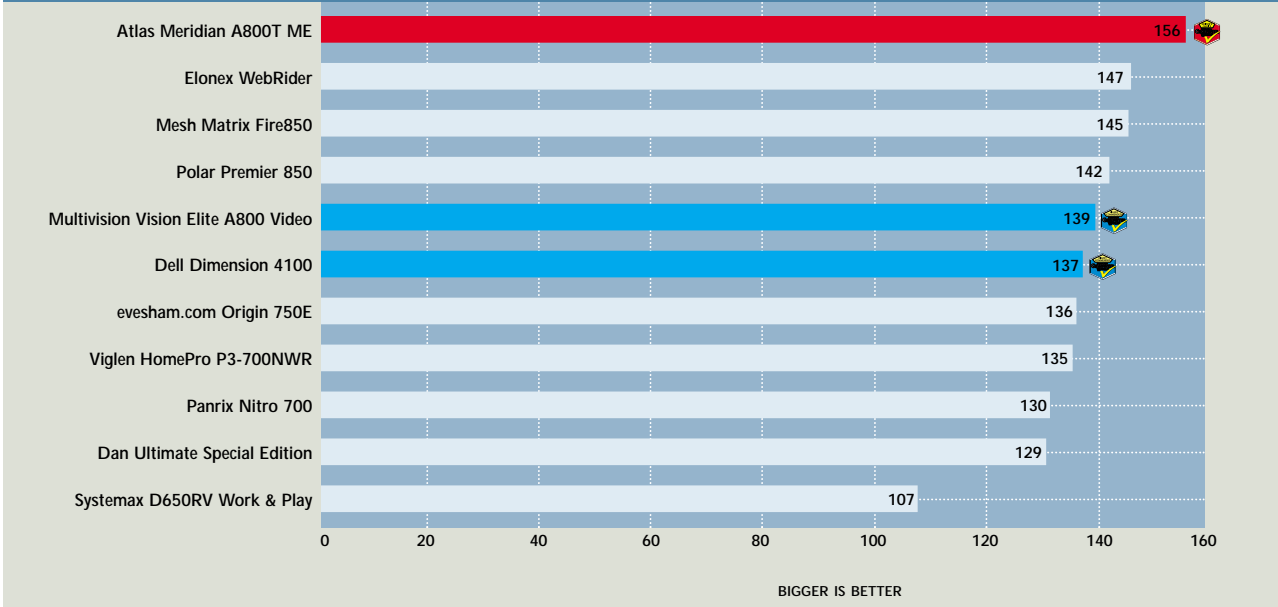
We tested each system's OpenGL performance with Quake III: Arena (1.11).

The settings were: video mode - 1,280 x 1,024, colour depth - 16bit, full screen, highest texture detail, texture quality - 16bit, texture filter - bilinear, lighting and lightmap.

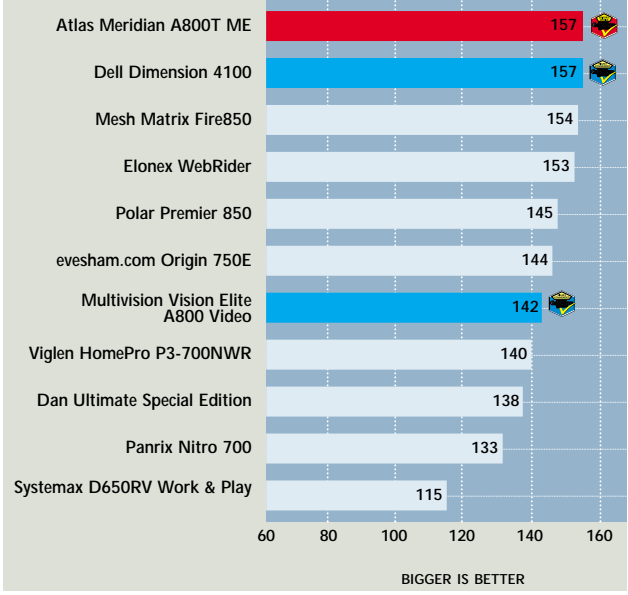
At command prompt we typed:
`timedemo 1`
`demo demo001`

This runs demo 1 and records the frames per second.

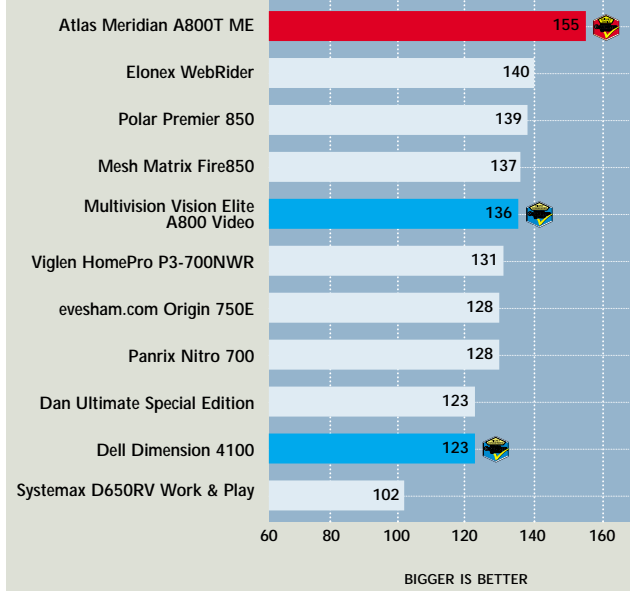
SYSmark 2000 overall



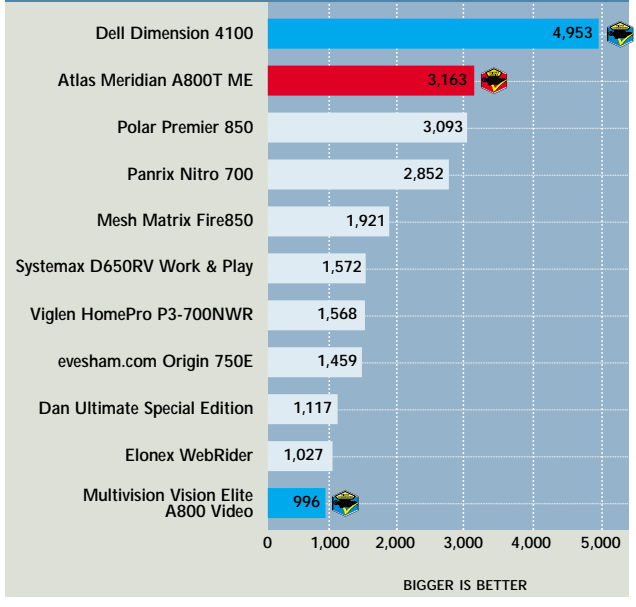
SYSmark 2000 Internet content creation



SYSmark 2000 office productivity



3DMark 2000 (1,280 x 1,024 at 16bit)



Quake III (fps) (1,280 x 1,024 at 16bit)

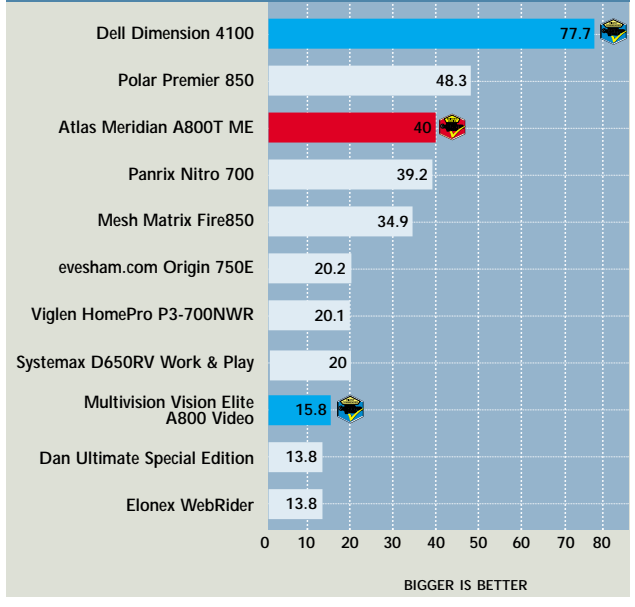


Table of features



MANUFACTURER	ATLAS	DAN TECHNOLOGY	DELL COMPUTERS	ELONEX	EVESHAM.COM
PRODUCT	MERIDIAN A800T ME	ULTIMATE SPECIAL EDITION	DIMENSION 4100	WEBRIDER	ORIGIN 750E
Price inc VAT (ex VAT)	£1,173.83 (€999)	£1,232.58 (€1,049)	£1,105 (€949)	£1,145.62 (€975)	£1,173.83 (€999)
Telephone	0700 285 275	020 8830 1100	0870 907 5664	020 8452 4444	0800 038 0800
HARDWARE SPECS					
Processor	Athlon 800MHz (Socket)	Pentium III 700MHz	Pentium III 800MHz	Pentium III 800MHz	Athlon 750MHz (Socket)
RAM/type	128MB/PC133	128MB/PC100	128MB/PC133	128MB/PC133	128MB/PC133
Occupied/spare RAM slots	1/2	1/2	1/1	1/1	1/2
Max memory in this configuration	1.1GB	1.1GB	384MB	384MB	1.1GB
Maximum memory supported by motherboard	1.5GB	1.5GB	512MB	1.1 GB	1.5GB
Hard disk (manufacturer and model)	IBM Deskstar DTLA 307015	Western Digital Caviar WD205BA	Western Digital Caviar WD204BA	Fujitsu MPE3027 AH	Maxtor 92049U6
HD size/interface	15.3GB/EIDE	20.5GB/EIDE	20.4GB/EIDE	27GB/EIDE	20.4GB/EIDE
Storage drive	Teac CD-W54E	N/A	N/A	N/A	N/A
Size of storage drive media	650MB	N/A	N/A	N/A	N/A
Storage drive interface	EIDE	N/A	N/A	N/A	N/A
MOTHERBOARD COMPONENTS					
Motherboard manufacturer	Asus	Asus	Dell OEM	MSI	MSI
Model/chipset	A7V/VIA KT133	CUV4X/VIA 694X/694Z	Intel/815E	MS 6323/VIA 694X (micro ATX)	MS-6330 (K7T Pro)/ VIA KT133
EXPANSION AND I/O					
No of 3.5/5.25in bays	4/3	4/3	5/2	3/2	2/3
No of free 3.5/5.25in bays	2/1	2/2	3/1	1/1	0/2
No of PCI/ISA/shared/AMR slots	4/0/1/0	4/0/1/0	5/0/0/0	2/0/0/1	5/0/1/0
No of free PCI/ISA/ shared/AMR slots	1/0/1/0	3/0/0/0	2/0/0/0	2/0/0/1	4/0/1/0
No of USB/serial/parallel/PS/2	2/2/1/2	2/2/1/2	2/1/1/2	2/2/1/2	2/2/1/2
MULTIMEDIA					
DVD manufacturer/model	Asus/E608	Hitachi/GD-7000	NEC/DV-5700A	Acer 16x	Samsung/SM-304 DVD/CD-RW
DVD speed/interface	8x/EIDE	8x/EIDE	12x/EIDE	16x/EIDE	4x/EIDE
Sound card manufacturer	Creative	Creative	Creative	Onboard	Onboard
Sound card model	Audio PCI	SB Live! 1024	SB Live! 1024	N/A	N/A
Speakers	ProMedia 3025	Jazz surround speakers	Harmon Kardon HK195	Cambridge Soundworks 100E	Creative CSW52
Graphics card	Hercules 3D Prophet II MX	ATI All-In-Wonder 128	nVidia GeForce2 GTS	ATI All-In-Wonder 128	ATI Rage 128 Pro VIVO
Chipset	nVidia GeForce2 MX	ATI Rage 128	nVidia GeForce2 GTS	ATI Rage 128	ATI Rage 128 Pro
RAM/max RAM and type	32MB/32MB SDRAM	32MB/32MB SDRAM	32MB/32MB DDR SGRAM	32MB/32MB SDRAM	32MB/32MB SDRAM
Graphics card interface	AGP	AGP	AGP	AGP	AGP
Monitor manufacturer/model	CTX PR705FT	CTX VL700	Dell E770p	Elonex MN017	Taxan ValueVision
Monitor size	17/16in	17in/15.7in	17in/16in	17in/15.8in	17in/16in
Flicker-free resolution and refresh	1,280 x 1,025 at 81Hz	1,152 x 864 at 75Hz	1,024 x 768 at 85Hz	1,024 x 768 at 85Hz	1,024 x 768 at 85Hz
OTHER INFORMATION					
Modem	Diamond SupraSST 56i Pro	Mri 1456 PCI (Conexant driver)	Aztec V.90 56K	MSI model to be included	Diamond SupraSST 56i Pro
Misc hardware	Prolink comboTV/TV tuner	MS Sidewinder joystick	3x FireWire (IEEE 1394) ports		
Bundled software	Lotus SmartSuite Millennium	Microsoft Works 2000, Games bundle	MS Works Suite 2000, MGI VideoWaveIII	Ulead VideoStudio SE	MS Works Suite 2000



MESH COMPUTERS	MULTIVISION	PANRIX	POLAR TECHNOLOGY	SYSTEMAX	VIGLEN
MATRIX FIRE850	VISION ELITE A800 VIDEO	NITRO 700	PREMIER 850	D650RV WORK & PLAY	HOMEPRO P3-700NWR
£1,173.83 (€999)	£1,115.08 (€949)	£1,173.83 (€999)	£1,173.83 (€999)	£1,173.83 (€999)	£1,056.33 (€899)
020 8208 4706	0121 550 8000	0113 244 4958	0800 138 1238	08707 297 366	020 8758 7000
Athlon 850MHz (Slot)	Athlon 800MHz (Socket)	Duron 700MHz	Athlon 850MHz (Slot)	Duron 650MHz	Pentium III 700MHz
128MB/PC100	128MB/PC133	128MB/PC133	128MB/PC100	128MB/PC133	128MB/PC133
1/2	1/2	1/2	1/2	1/2	1/2
640MB	640MB	1.1GB	640MB	640MB	512MB
768MB	768MB	1.5GB	768MB	768MB	512MB
Maxtor 33073U4	Seagate Barracuda ST330630A	IBM Deskstar DTLA 307015	IBM Deskstar DTLA 307030	Maxtor 53073H6	Western Digital Caviar WD204BA
30.7GB/EIDE	30.6GB/EIDE	15.3GB/EIDE	30.7GB/EIDE	30.7GB/EIDE	20.4GB/EIDE
N/A	Teac CD-W54E	Imega ZIP250	N/A	Ricoh combo drive MP9060	N/A
N/A	650MB	250MB (one disk included)	N/A	650MB	N/A
N/A	EIDE	EIDE	N/A	EIDE	N/A
Gigabyte	EPoX	Asus	Gigabyte	Biostar	Viglen OEM (D815EEA)
GA71XE/AMD 751/756	EP-8KTA/VIA KT133	A7V/VIA KT133	GA71XE/AMD 751/756	M7VKB/VIA KT133	Intel/815E
3/3	4/3	4/2	3/2	3/3	4/2
1/2	2/1	2/1	2/1	1/1	2/1
4/1/1/0	5/0/1/0	4/0/1/0	5/2/1/0	4/0/1/1	5/0/0/0
1/1/1/0	4/0/1/0	2/0/0/0	3/2/1/0	3/0/1/1	3/0/0/0
2/2/1/2	2/2/1/2	5/2/1/2	2/2/1/2	2/2/1/2	2/1/1/2
Pioneer/DVD-115	Pioneer/DVD-104	Pioneer/DVD-104S	Pioneer/DVD-104S	Ricoh/MP9060	Pioneer/DVD-115
16x/EIDE	8x/EIDE	10x/EIDE	10x/EIDE	6x/EIDE	16x/EIDE
Creative	Onboard	Creative	Creative	Onboard	Creative
SB Live! 1024	N/A	SB Live! 1024	SB Live! 1024	N/A	SB 128 PCI
PC Works 4-point surround	Labtec LCS 2414	Labtec Spin-70	Labtec 1030S	Creative SBS52	Altec Lansing ACS33
Guillemot 3D Prophet SE	Guillemot Cougar Video Edition	Asus V6600 Deluxe	Asus V6800 Deluxe	ATI Rage 128 Pro VIVO	ATI Rage 128 Pro VIVO
nVidia GeForce 256	Riva TNT2 M64	nVidia GeForce 256	nVidia GeForce 256	ATI Rage 128 Pro	ATI Rage 128 Pro
32MB/32MB/SDRAM	32MB/32MB/SDRAM	32MB/32MB/DDR SGRAM	32MB/32MB/DDR SGRAM	32MB/32MB SDRAM	32MB/32MB SDRAM
AGP	AGP	AGP	AGP	AGP	AGP
Sony CDP-E200E	LG Flatron 775FT	Mitsubishi Diamond Plus73	Mitsubishi Diamond Pro 720	CTX PR705F	Viglen Envy 17CP (CTX PL7)
17in/16in	17in/16in	17in/16in	17in/16in	17in/16in	17in/15.7in
1,280 x 1,024 at 81Hz	1,024 x 768 at 85Hz	1,024 x 768 at 85Hz	1,600 x 1,200 at 75Hz	1,280 x 1,024 at 81Hz	1,024 x 768 at 85Hz
Diamond SupraSST 56i Pro	Motorola SM56 PCI HSP	Diamond SupraExpress 56i Pro VCC	Diamond SupraSST 56i Pro	Simply 56K V.90	Diamond SupraSST 56i Pro
3x FireWire (IEEE 1394) ports	Headset and mic			Creative CD5233E 52x CD-ROM, Epson Stylus 480, Intel Create and Share WebCam Pack	
MS Works Suite 2000	Lotus SmartSuite Millennium, IBM ViaVoice, Ulead VideoStudio SE	Microsoft Works 2000, games bundle, Ulead VideoStudio SE		Lotus SmartSuite Millennium	Microsoft Works 2000



Editor's Choice

It was clear from the outset that this was going to be a closely fought contest. This was because all the manufacturers wanted to build a machine that would show off the enhanced Windows ME multimedia components.

The offerings from the manufacturers we approached this month were quite varied, with some contenders opting for video-in-and-out-ready graphics cards while others have gone down the FireWire road. The latter option is becoming increasingly popular, especially on digital video cameras, but it perhaps has a more specialist appeal and may leave some home users without a means of transferring video to their PCs. Standard graphics cards with video capture, however, either come with both composite inputs and outputs or an S-Video socket. These connectors are far more likely to be found on peripherals such as VCRs, camcorders and TVs. Some video-capable cards have the added bonus of a TV tuner, but bear in mind that to use one legally you will need a full TV licence.

Another important factor to consider when creating and editing video sequences is the way that the resulting file types rapidly eat up hard-drive space. So in order to decide on a winner we placed extra emphasis on a removable storage device that could handle these sizes, such as a CD-RW. We were also after an all-round home-user spec that struck the best balance between value for money, component choice, a decent

software bundle and a good warranty. Overall, the performance of the group test entrants was taken into account but was not considered to be of the utmost importance.

The winners

Taking into account the requirements of the brief, this month's **Editor's Choice** goes to the Atlas Meridian A800T ME. It is a well-balanced machine offering an Athlon 800MHz CPU, 128MB of PC133 RAM and a CD-RW, together with an excellent CTX monitor. The system is quick, thanks to the GeForce2 MX card, and comes with a separate TV tuner card, which features video capture and playback capabilities. However, these added extras come at a price and something had to be compromised. In this case it turned out to be the smaller 15GB hard drive. The Multivision Vision Elite A800 Video beats the Atlas system on price and warranty, but if you want to watch TV and feel the need for speed it's a winner.

Coming close to knocking the Atlas off its pedestal is the Multivision Vision Elite A800 Video, which wins our first **Highly Commended** award. It has the same processor as the Atlas but a larger 30.6GB hard drive that on its own is a decent investment as software installations continue to grow. The Multivision also comes with a warranty that stretches over a five-year period, making it stand out from the rest of the crowd.

On top of that, these impressive

features are bolstered by a decent video-capable graphics solution that offers an S-Video and composite output. It was also one of the few machines to feature a backup device in the form of a Teac CD-RW, allowing you to make copies of your videos for archiving or perhaps to send to family and friends. The 17in LG Flatron 775FT is a good example of a flat-screen monitor with little evidence of reflections and a vibrant picture.

As far as software is concerned, copies of Lotus SmartSuite Millennium and IBM's ViaVoice are included, as well as Ulead's VideoStudio SE that will come in handy if you don't get on with ME's Movie Maker. With the whole package costing £50 less than most of the competition, the Multivision Vision A800 Elite Video easily secured an award.

The final **Highly Commended** award goes to the Dell Dimension for looking to the future and including FireWire ports instead of the standard video-capable graphics card. It has also managed to include an nVidia GeForce2 GTS graphics card and matched Multivision pound for pound. It's bound to appeal to anyone with a hankering for top performance and game-play. It only missed out on an Editor's Choice gong because there was no CD-RW included. Also, some home users may not own a FireWire device and could be limited here. The Dell wins an award because it may appeal to the more specialist user who could always add a video-capable card if they wanted to use the £50 Dell shaved off our price limit.



Atlas' Meridian A800 PC features a separate TV tuner card as well as its GeForce2 MX graphics card



Multivision's Vision Elite A800 Video offers both Movie Maker and Ulead VideoStudio SE for editing home movies



Dell's Dimension is ready for future peripherals with its FireWire ports, which offer fast file transfer

Motherboard

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medley

Building your own PC allows you not only to keep the project within budget, but also to choose what components you want, and it's vital to get the motherboard right, so we've put 21 Intel and AMD boards to the test

Although components such as graphics cards, CPUs and hard disks tend to get the most exposure in the PC arena, all these bits would be useless without a motherboard to plug them into. The motherboard is like the backbone of your PC and every other component is dependent on it.

The type of motherboard you choose will determine what CPU you can run, how many expansion cards you can have and what type of hard disk you can install.

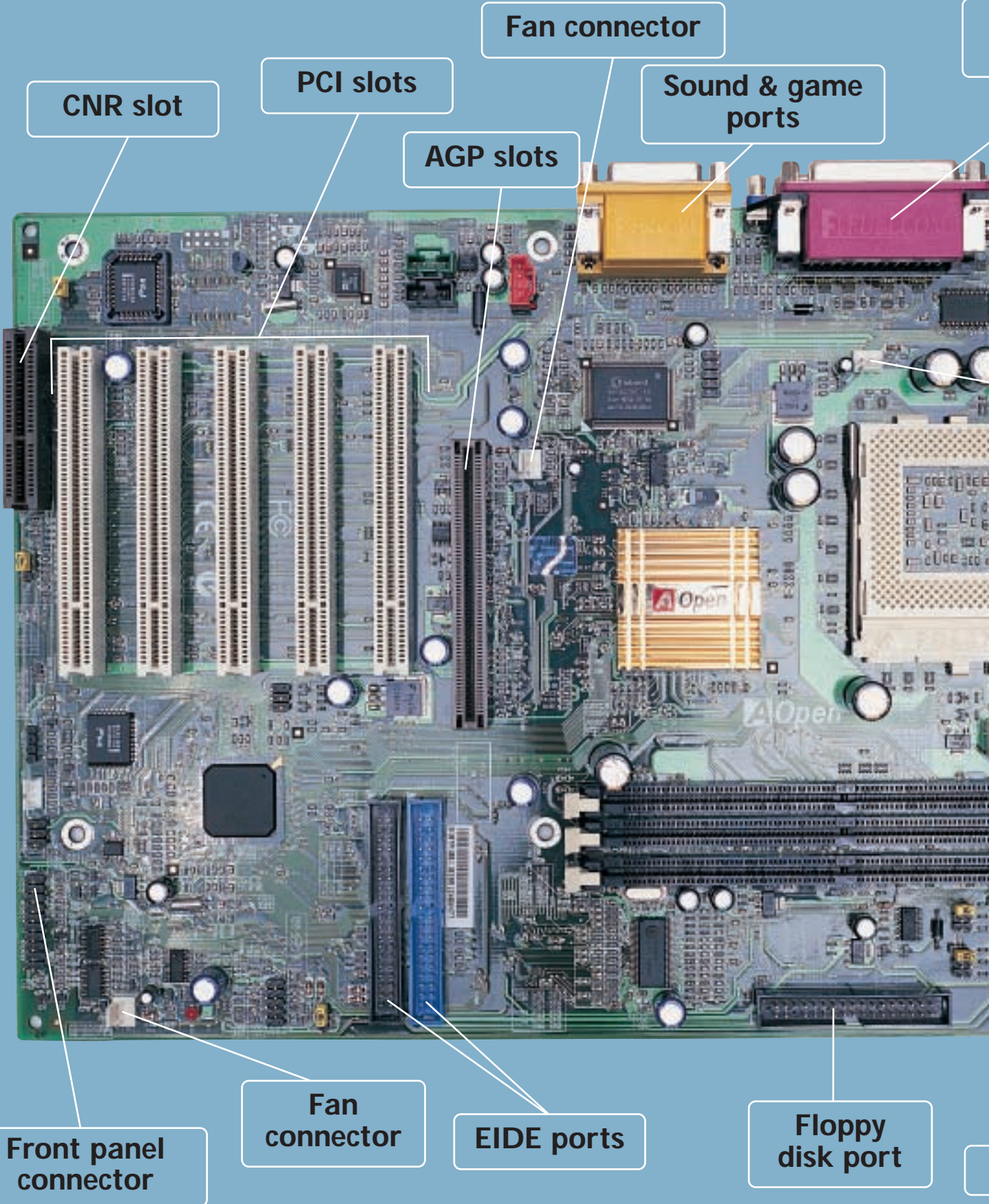
That said, there's more to a motherboard than its features. How it's designed and laid out is also vitally important. Where the power, hard disk and floppy drive connectors are located can determine whether your system internals will be tidy or messy.

Another thing to consider when buying a motherboard is the documentation that comes with it. Building a PC can be a tricky business and you want detailed and clear instructions on how to set up and configure the board you're installing.

To help you decide which motherboard is best we've rounded up 21 of the latest models and cast our very critical eye over them. We've taken all the above criteria into account to decide which board is top dog. The test is split into two categories, one for Intel chip boards and one for AMD chip boards. So, if you're looking to build a new PC or just upgrade your existing one, don't spend any money until you've perused the following pages.

PHOTOGRAPH HUGH THRELFALL

Anatomy of a mother



Serial parallel & VGA ports

USB ports

PS/2 connectors

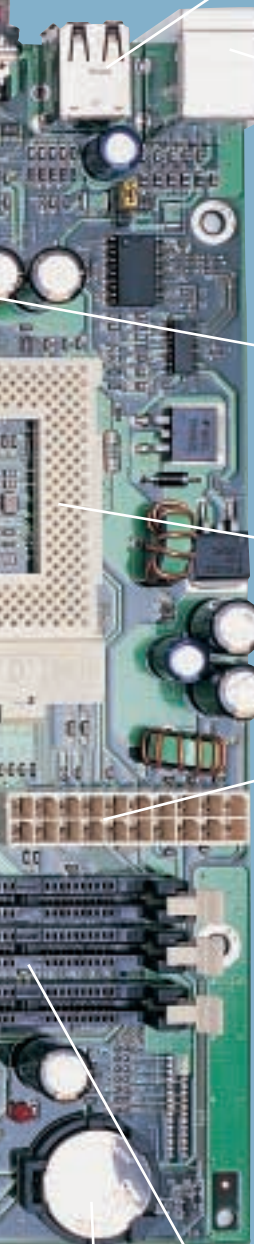
Fan connector

CPU socket

ATX power supply

DIMM sockets

Battery



AGP Accelerated Graphics Port. An expansion slot specifically for graphics cards, offering high bandwidth.

AMR Audio Modem Riser. An expansion slot for audio/modem riser or modem riser cards.

BIOS Basic Input Output System. Communicates between the hardware and the OS. Where all the system settings are configured and stored. A BIOS can be upgraded if new features arrive.

CNR Communication Network Riser. Similar to AMR but also supporting LAN connectivity.

DIMM Dual Inline Memory Module. A 168pin memory stick, usually SDRAM although EDO DIMMs are still available.

EIDE Enhanced Integrated Device Electronics. The standard used for most hard disks and other storage devices. Most motherboards can support four EIDE devices, although some can handle eight.

FSB Front-Side Bus. The speed at which the CPU communicates with the system memory.

ISA Industry Standard Architecture. A 16bit expansion slot that's now almost extinct. Very few new cards are available in this format.

Parallel port Similar to the serial port but with faster bi-directional transfer. Usually used for printers and scanners.

PCI Peripheral Component Interconnect. A 32bit expansion slot used for the majority of expansion cards other than graphics adaptors.

POST Power On Self Test. The first operation that is executed when the system is switched on. Checks the status of the memory, processor and other components.

SCSI Small Computer System Interface. Similar to EIDE but catering to a more professional market. Up to 15 devices can be connected and transfer rates are far superior to EIDE.

SDRAM Synchronous Dynamic Random Access Memory. Fast system memory that superseded EDO RAM.

Serial port Also known as COM ports, serial ports are used to connect peripherals to your PC such as modems, PDAs and digital cameras.

Slot 1 The CPU connector for early Intel Pentium III processors.

Socket A The CPU connector for AMD Athlon and Duron processors.

Socket 370 The CPU connector for Intel Celeron and PIII processors.

SMP Symmetric MultiProcessing. A multiprocessor configuration where two or more processors share the same memory and system bus.

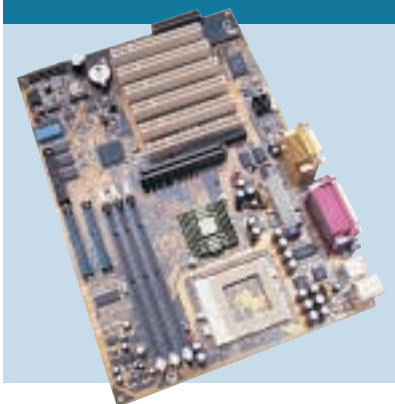
UltraDMA66 An EIDE bus mastering standard that allows a burst transfer rate of up to 66Mbytes/sec.

UltraDMA100 The latest EIDE bus mastering standard that allows burst transfer rates of up to 100Mbytes/sec.

USB Universal Serial Bus. The successor to serial and parallel ports. USB offers 12Mbits/sec transfer and hot-swapability.

Abit SE6

INTEL



ABIT BOARDS HAVE become very popular, with the classic dual-Celeron BP6 board earning kudos for the company.

The SE6 is an Intel CPU board based on the Intel 815E chipset. The board's

layout is good, but the position of the ATX power socket behind the parallel and VGA ports lets it down. As well as the obligatory AGP slot, you get six PCI slots, although one is shared.

Behind the three DIMM sockets are the two EIDE connectors that support the latest UltraDMA100 standard.

The VGA port is located next to the COM 1 serial port, with the second serial port supplied on a backing plate. There's also onboard sound, with complementing audio and game ports. The sound can easily be disabled via a bank of dip switches that can also manually configure CPU and bus frequency settings if you don't want to use the soft menu in the BIOS.

The documentation is superb, with a

comprehensive manual that will suit both novice and expert alike.

The SE6 is an impressive 815E board and at £99 ex VAT it offers reasonable value, placing it between the AOpen AX3S Pro and the Asus CUSL2.

DETAILS

PRICE £116 (£99 ex VAT)

CONTACT dabs.com 0800 138 5204

www.abit.com.tw

PROS Great documentation; good features; reasonable price

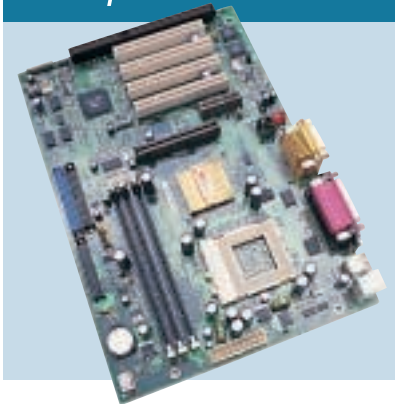
CONS Poor position of ATX power connector

OVERALL A great 815E board up there with the AOpen AX3S Pro and Asus CUSL2

LAYOUT	★★★★
DOCUMENTATION	★★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

AOpen AX34 Pro

INTEL



ALTHOUGH THIS BOARD supports Intel CPUs it sports the VIA 694X chipset instead of the Intel 815. Several large capacitors surround the Socket 370 CPU connector, but they don't

really obstruct access. The ATX power connector is located at the very top of the PCB keeping the wiring loom out of the way. Three DIMM sockets allow a maximum of 1.5GB of PC133 memory.

On the down side, the board only sports four PCI slots, one of which is shared with an ISA slot. An AMR slot is located underneath the AGP slot. You also get two extra USB ports on a backing plate.

There are two EIDE channels, but they only support UltraDMA66 rather than UltraDMA100. There are also onboard sound and game ports.

The documentation is superb, with an incredibly comprehensive manual and a fold-out quick-start guide, so it's easy to set the board up.

Even though performance isn't an issue in this test, the AX34 Pro was very slow compared to the competition. That said it's very cheap and there's a copy of Norton Anti Virus thrown in to add value. If money's tight it's worth a look.

DETAILS

PRICE £86.59 (£73.70 ex VAT)

CONTACT RK Distribution 01844 216 226

www.aopen.com

PROS Great documentation; fairly cheap

CONS Only four PCI slots, no UltraDMA100 interface

OVERALL A reasonably priced board, but AOpen's AX3S Pro is a better bet

LAYOUT	★★★
DOCUMENTATION	★★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

AOpen AX3S Pro

INTEL



IF THERE WAS AN AWARD for packaging, AOpen's AX3S Pro would win hands down and, thankfully, the board itself is as impressive. This is an Intel chip board based on the

815E chipset, covered by AOpen's gold heatsink.

There are five PCI slots and single AGP and CNR slots. The layout isn't as good as other AOpen boards as the EIDE controllers are behind one of the PCI slots. But there is an UltraDMA100/66 cable, plus a second EIDE cable and a backing plate with two USB ports.

The ATX power connector is mounted at the top of the PCB, keeping the power loom out of the way.

This board ships with AOpen's Die Hard BIOS, which keeps a basic BIOS image safe in case of a virus. If your BIOS becomes infected, you can flick a switch and revert to the rescue BIOS, the machine will then boot and allow you to flash the full BIOS and wipe the virus.

The documentation is first rate, and the inclusion of Norton Anti Virus is a bonus. Only setting the CPU frequency in the BIOS was tricky, but this is minor considering the quality of this board.

DETAILS

PRICE £113.66 (£96.38 ex VAT)

CONTACT CMS Computers

0151 709 0900 www.aopen.com

PROS Excellent documentation; two EIDE cables supplied; feature rich

CONS EIDE connectors could be better placed

OVERALL A superb 815E-based board with everything you need in the box

LAYOUT	★★★★
DOCUMENTATION	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL RATING	★★★★★



Asus CUSL2

INTEL



ASUS HAS A GREAT reputation when it comes to motherboards and the CUSL2 only strengthens it.

This Socket 370 board is based on the Intel 815E chipset and is stacked

with features. If you're not happy with the onboard graphics, Asus has included an AGP Pro slot, ideal if you can find an AGP Pro card, but it will still happily accept a standard AGP card. There are also six PCI slots, one of which is shared with a CNR slot, while a second CNR slot nestles at the bottom of the board.

Layout is a little cramped with too many capacitors scattered around the board, but none of the major areas are obstructed. The location of the ATX power socket behind the COM ports is a little disappointing, but the floppy and EIDE channels are neatly placed on the far right of the board. The EIDE bus supports the UltraDMA100 standard but, unlike AOpen, Asus has only supplied a single cable. As well as the

two USB ports on the board, there is a backing plate with another three USB ports in the box.

The in-depth manual is very good and the Asus is an excellent board with solid performance, but it's not cheap.

DETAILS

PRICE £136.30 (£116 ex VAT)

CONTACT dabs.com

0800 138 5204 www.asus.com

PROS Well built and feature rich; great documentation

CONS Expensive, but worth it

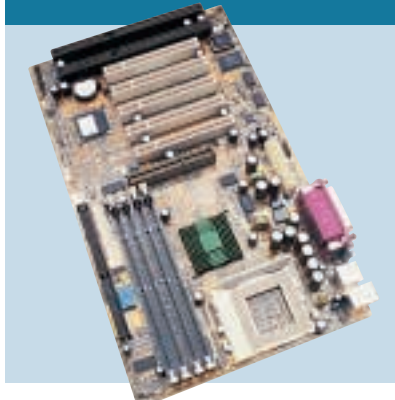
OVERALL If you've got the money to spend, this is a fantastic board

LAYOUT	★★★★
DOCUMENTATION	★★★★★
VALUE FOR MONEY	★★★★★
OVERALL RATING	★★★★★



FIC FB11

INTEL



THIS BOARD IS UNLIKE any other in the test in that it sports the old Intel BX chipset. This is not necessarily bad since our tests have shown that the BX chipset is not much slower than the newer

chipsets. The BX chipset is only rated to run with a 100MHz FSB, but FIC has modified it to support a 133MHz FSB.

The FB11 suffers from poor placing of the ATX power socket; it's located below the COM ports and surrounded by capacitors. The EIDE and floppy connectors are well placed at the far right, although the EIDE channels are only UltraDMA33 compatible. On the plus side, the FB11 sports four DIMM sockets as opposed to the standard three. There are five PCI slots, with one shared with one of the two ISA slots, but there are no CNR or AMR connectors.

The documentation is fairly comprehensive with enough information to get the board up and running easily.

There's no soft CPU and FSB

frequency setting and this must be configured via dip switches. This board uses old technology, but at £59 ex VAT it's the cheapest board on test.

DETAILS

PRICE £69.32 (£59 ex VAT)

CONTACT Stac Trading 01788 844 444

www.fic.com.tw

PROS Very cheap; four DIMM slots; good manual

CONS Old chipset; UltraDMA33 EIDE; no soft CPU setup

OVERALL A good board if you're on a very tight budget, although the TMC TA64-B costs only a little more

LAYOUT	★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

Fujitsu Siemens D1184-81X

INTEL



SPORTING THE INTEL 815 chipset, you get onboard graphics in case you don't have a card. There's also onboard sound to save you another expansion slot.

The board layout is a bit of a mixed bag, the bottom half of the PCB is pretty spartan, but the ATX power supply, floppy disk controller, EIDE connectors and front panel connectors are all squeezed in to the right of the DIMM sockets. This kind of positioning will result in a mass of tangled cables when a PC is built around the board and the front panel connectors are not labelled, leaving you to look through the manual for the correct assignments.

The manual is a sparse, lightweight pamphlet of 12 pages and looks very poor in comparison to some of the others.

There are five PCI slots available, none of which are shared. Besides the AGP slot, the only other expansion area is the single AMR slot, which is a little

disappointing since most other 815 boards sport CNR slots instead.

We were disappointed with the Fujitsu Siemens, which performed no better than the Abit that offers a better solution for a similar price.

DETAILS

PRICE £129.25 (£110 ex VAT)

CONTACT AGP Distribution 01794 528 000

www.fujitsu-siemens.co.uk

PROS Good performer

CONS Badly designed layout; poor documentation

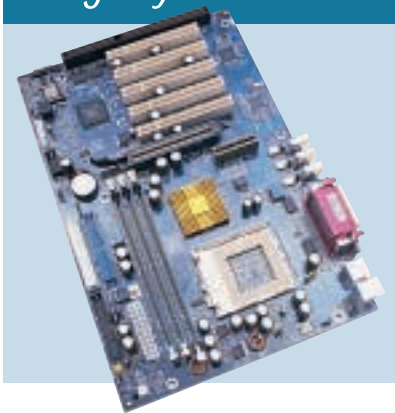
OVERALL A disappointing board from a major IT player

LAYOUT	★★
DOCUMENTATION	★
VALUE FOR MONEY	★
OVERALL RATING	★★



Gigabyte GA GVX7-1394

INTEL



THIS IS SOMETHING really special. As well as the usual array of USB, serial and parallel ports, the GVX7-1394 sports three FireWire ports. This makes this board the ideal choice for anyone

building a PC for digital video editing. Resplendent in Gigabyte's usual blue, the layout of the board is first rate. The EIDE, floppy and ATX power connectors are all at the top right of the PCB so there shouldn't be any cables trailing over the surface of the board. Because the chipset is VIA's Apollo Pro 133A there's no UltraDMA100 support, but you do get UltraDMA66.

Below the AGP slot are the five PCI slots, one of which is shared with the single ISA slot. There's also an AMR slot above the AGP.

Documentation is comprehensive and easy to follow so installation should be no problem. Adding considerably to the package is a copy of MGI VideoWave III to kickstart your digital video editing –

assuming you have a DV camcorder. The only downside is that you have to set the CPU and FSB frequencies via dip switches.

Even with the extra connectivity and the bundled software the GVX7-1394 only costs £95 ex VAT.

DETAILS



PRICE £111.62 (£95 ex VAT)

CONTACT dabs.com

0800 138 5204 www.gigabyte.com.tw

PROS FireWire ports; great layout; solid documentation; good value

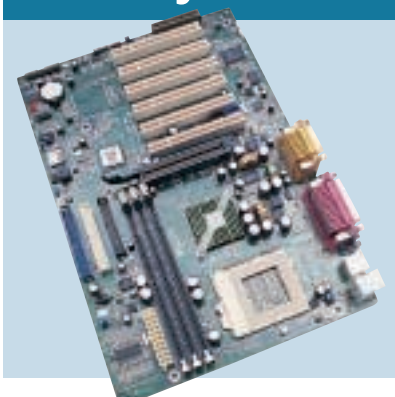
CONS No UltraDMA100 support

OVERALL A feature-packed board that's unique in the group

LAYOUT	★★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

QDI SyntactiX 2E

INTEL



QDI'S INTEL-BASED motherboard sports the 815E chipset. The EIDE ports and floppy connectors are on the far right of the board and the ATX power connector is placed at the top right of

the PCB to keep the wiring loom out of the way. The ZIF socket is free from obstructions and the AGP slot has a clasp to stop the card from slipping out. Unfortunately, QDI has positioned the modem and CD audio connectors for the onboard sound chipset between the top two PCI slots. Not only does this make connecting them more difficult, but it also means that the cables have to drape across PCI cards. On the plus side, there are six PCI slots, although one of them is shared with the single CNR slot.

As with all 815-based boards, one of the serial ports is supplied on a ribbon cable and backing plate to accommodate the VGA port for the onboard graphics. The latest UltraDMA100 standard is supported by the EIDE

ports, assuming that you have a compatible drive.

Documentation is pretty good and you shouldn't have any trouble getting the board set up.

QDI has built a decent, reasonable value board out of Intel's latest chipset.

DETAILS

PRICE £108.10 (£92 ex VAT)

CONTACT Swift Tech 01480 433 100

www.qdigrp.com

PROS Decent documentation; good value

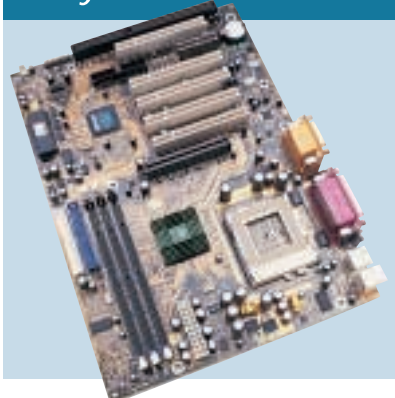
CONS Bad positioning of audio connectors

OVERALL A competent 815E board that's unlikely to disappoint

LAYOUT	★★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

Soyo SY-7VCA

INTEL



SOYO IS A FAIRLY well-known name in the motherboard industry. It has in the past produced some pretty good boards, so it came as quite a surprise that the SY-7VCA was a disappointment.

This is a board for Intel CPUs sporting the VIA 694X chipset rather than Intel's own 815 and its layout is a hit-and-miss affair. The ATX power connector is placed at the top of the PCB for maximum convenience and the UltraDMA66-compatible EIDE controllers are located on the far right. However, the floppy drive connector is surrounded by two PCI slots and the AMR slot, leaving the cable to trail across much of the board en route to the drive.

There are five PCI slots, although one is shared with the single ISA slot. The front panel connectors are not labelled, leaving you to search the very sparse manual for the correct pin settings.

There's onboard sound complete with the audio ports and game

connector. Unfortunately, like QDI, Soyo has placed the CD-IN connector between two PCI slots.

The SY-7VCA's saving grace is its price of £62 ex VAT, but our advice would be to spend a bit more elsewhere.

DETAILS

PRICE £73 (£62.12 ex VAT)

CONTACT CCL Computers 01274 269 001

www.soyo.nl

PROS Very cheap; Norton Ghost and Anti Virus bundled

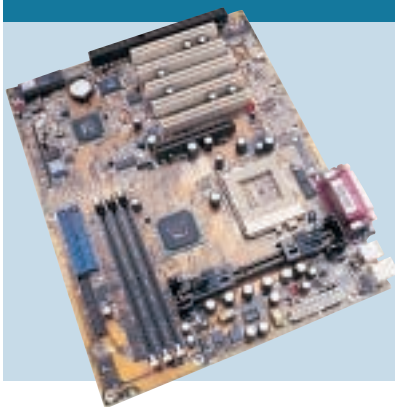
CONS Poor documentation; bad layout

OVERALL A cheap board that's lacking in some key areas

LAYOUT	★★
DOCUMENTATION	★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★

TMC TA64-B

INTEL



TMC WALKED AWAY with two awards in the last motherboard group test, so we were keen to see how it would fare this time around.

The TA64-B is an Intel-based board

sporting the VIA 694X chipset, but what makes it special is that it has both Slot 1 and Socket 370 connectors onboard, although you can't populate both simultaneously.

As well as its compatibility this board has some great features. For example, the front panel connectors are clearly labelled and separated so there's no need to look in the manual when installing. Although even if you did, the manual is clearly laid out and detailed.

The layout is excellent, with the ATX power socket at the top of the PCB and nothing obstructing any important areas. There are five PCI slots, one of which is shared with an ISA slot. The AGP slot is the only other expansion slot, with no sign of a CNR or AMR connector.

The only let-down is the TA64-B's lack of UltraDMA100 support, but as this board only costs £69 ex VAT, this is a minor point. So, if you're happy with a non-Intel chipset, TMC has produced a decent board at a very attractive price.

DETAILS

PRICE £81 (£69 ex VAT)

CONTACT TMC Technology 01438 842 300
www.tmc-uk.com

PROS Great layout; Slot1 and Socket 370; good documentation; very cheap

CONS No CNR; no UltraDMA100

OVERALL A great value board, ideal for the transition from Slot 1 to Socket 370

LAYOUT	★★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

Transcend TS-ASL3

INTEL



IT'S A GOOD THING that this board from Transcend is fairly easy to set up because the manual spans a not too impressive six pages. Of course, there is a manual on the supplied CD-ROM, but

if you're building a PC from the ground up, the chances are that you don't have access to a CD-ROM drive at the time. This issue is compounded by the fact that the Abit SE6 and AOpen AX3S Pro both ship with excellent documentation and cost less than the Transcend.

The board itself is fairly well laid out with the ATX power connector placed at the top of the PCB so that the power loom is well out of the way. The EIDE connectors are positioned behind the PCI slots, but they're not parallel to them so they shouldn't get in the way.

Like the Abit there are six PCI slots with one shared with the CNR slot.

Since it's based on the Intel 815E chipset, the TS-ASL3 only has one serial port hard-wired to the board with the

VGA port for the onboard graphics next to it. The second serial port is supplied on a backing plate with a ribbon cable.

Onboard sound adds some value, but the Transcend is hard to recommend when there are better motherboards from AOpen and Abit that also cost less.

DETAILS

PRICE £124.55 (£106 ex VAT)

CONTACT Vortex Services 0161 343 5555
www.transcend.nl

PROS Fairly good layout

CONS Terrible documentation; over-priced

OVERALL A disappointing 815E board that's eclipsed by the competition

LAYOUT	★★★★
DOCUMENTATION	★
VALUE FOR MONEY	★★
OVERALL RATING	★★

Tyan S1854 Trinity 400

INTEL



THIS IS ONE OF only two examples in the test that will accept Intel processors in both the Slot 1 and Socket 370 form factor. This is useful if you have a Slot-based CPU now and want to

upgrade to a Socket version later. The board employs the VIA 694X chipset so it lacks some of the features offered by the 815-based boards. That said, it offers impressive value at only £69 ex VAT.

The layout is very impressive with the EIDE, floppy and ATX power connectors all located at the top right edge of the PCB. There are a few capacitors close to the Slot 1 but they're not in the way. The only let-down is that the front panel connectors are not labelled clearly, leaving you to trawl through the manual to find the correct configuration.

The manual is good, although the photos are poor but there's enough info to get you up and running easily.

Another plus for the Tyan is that it's

one of only three boards in the test that ships with two EIDE cables.

If you want maximum flexibility this is a good board, but the TMC TA64-B has better documentation and layout.

DETAILS

PRICE £81.07 (£69 ex VAT)

CONTACT Simply 0870 727 4020
www.tyan.com

PROS Flexible; great value; decent layout; two EIDE cables

CONS Poor illustrations in manual; no UltraDMA100, no CNR

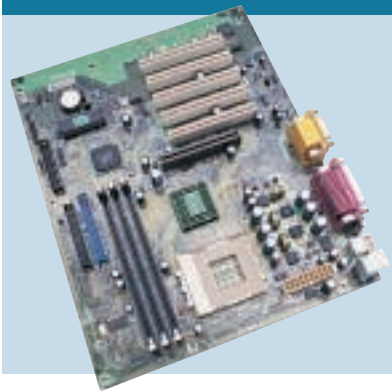
OVERALL A very flexible board at a great price, worth a look if you have a Slot 1 CPU

LAYOUT	★★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★



AOpen AK33

AMD



THE AK33 IS THE fastest AMD board on test, but since it's only one point ahead of the next fastest boards there's not much point in dwelling on the fact.

A message on the bottom of the

board says: 'We design this board with pride'. It's good that AOpen takes quality control so seriously, but this message comes at the expense of an expansion slot. You're left with five PCI slots and the AGP slot.

Unlike the other two AOpen boards in this group test, this one doesn't sport the gold heatsink, but it does have the ATX power socket mounted at the very top of the PCB to keep the wiring loom out of the way.

Two UltraDMA66 EIDE controllers and the floppy disk connector are located on the far right of the board for easy routing of the ribbon cables.

Strangely, AOpen has supplied a serial port on a backing plate with a ribbon cable instead of mounting it on

the board. There's also an array of connectors for the onboard sound.

The superb manual and quick-start guide make installing and setting up a breeze, and you get Norton Anti Virus too.

DETAILS

PRICE £96.22 (£81.89 ex VAT)

CONTACT RK Distribution 01844 216 226

www.aopen.com

PROS Great documentation; uncluttered design; fastest board

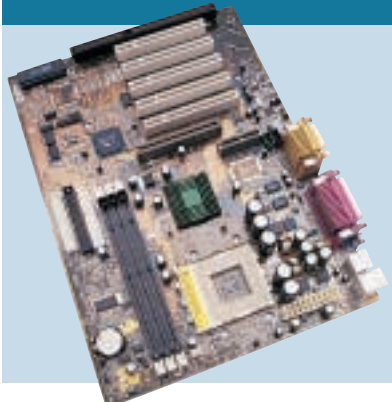
CONS Wasted space where an expansion slot could be; serial port on a cable

OVERALL A decent AMD solution that could have been better with an extra expansion slot

LAYOUT	★★★
DOCUMENTATION	★★★★★
VALUE FOR MONEY	★★★
OVERALL RATING	★★★★

Biostar M7VKB

AMD



THE BIOSTAR M7VKB turned in a good performance ranking joint second in the SYSmark tests, but since most of the AMD-based boards were so closely grouped it's unlikely that you'd

see any real advantage over any of the others.

The M7VKB is based on the VIA KT133 chipset and Biostar has done a fair job of designing the board but there are still problems. Even though the ATX power socket is located at the very top of the board it's flanked on both sides by capacitors that also restrict access to the ZIF socket. The EIDE and floppy connectors are at the far right of the board and like almost every other board, only one EIDE cable has been supplied.

The front panel connectors are not labelled which leaves you to refer to the woefully inadequate documentation. The manual consists of a single A4 sheet folded in half to produce four pages of A5. This is the worst documentation of all

the boards on test. There is a full manual on the CD-ROM, but that's not much help if you're building a PC from scratch.

You get two extra USB ports in the box, making a total of four, but this does not make up for terrible documentation.

DETAILS

PRICE £92.82 (£79 ex VAT)

CONTACT Simply 0870 727 4020

www.biostar.com.tw

PROS Fast performer; ISA and AMR slots

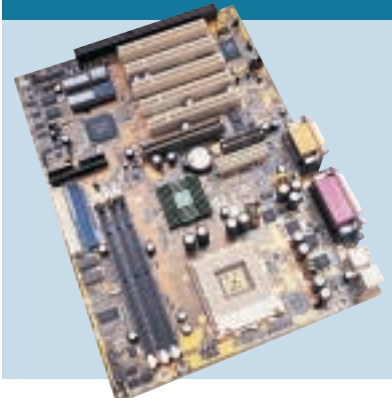
CONS Terrible documentation; unlabelled front panel connectors

OVERALL The lack of manual overshadows any good points that this board may have

LAYOUT	★★★
DOCUMENTATION	★
VALUE FOR MONEY	★★★
OVERALL RATING	★★

Chaintech CT-7AJA

AMD



THIS IS A SOCKET A motherboard based on the VIA KT133 chipset. It sports Chaintech's TwinBIOS feature which is basically a copy of Gigabyte's DualBIOS feature. This means that if

your BIOS is corrupted by a virus the board will boot from the second BIOS and then copy its image to the first, thus overwriting the corrupted version.

The layout is somewhat lacking with the ATX power socket close to the middle of the PCB behind the sound and game ports. At least the UltraDMA66 EIDE channels and the floppy drive connector are on the far right of the board, but the floppy connector is at 90 degrees to the edge of the board. The reason for this is that there are four banks of dip switches on the right that the manual says are reserved and shouldn't be touched.

There are five PCI slots, one shared with the single ISA slot. The AGP slot and single AMR slot are above the PCI slots.

There's onboard sound, but the CD

and AUX-IN sockets are located to the left of the PCI slots making it difficult to route the cables tidily.

Documentation should get you through the setup easily, but there are better Socket A boards available.

DETAILS

PRICE £92.82 (£79 ex VAT)

CONTACT evesham.com 0800 038 0800

www.chaintech.com.tw

PROS TwinBIOS feature

CONS Poor layout; space wasted by unused dip switches

OVERALL A disappointing board that could easily have been better

LAYOUT	★★★
DOCUMENTATION	★★★
VALUE FOR MONEY	★★★
OVERALL RATING	★★★

EPoX EP-8KTA

AMD



EPoX MAY NOT BE big in the motherboard world, but many system integrators supply EPoX boards. The EP-8KTA is a motherboard for AMD chips and is based on the VIA KT133 chipset.

The board has three DIMM sockets, one AGP slot and six PCI slots, one of which is shared with a single ISA slot.

The layout is quite poor with the ATX power socket hidden behind a large bank of capacitors. These obstruct the ZIF socket making it quite difficult to insert and remove CPUs. Also, the two UltraDMA66 EIDE connectors are positioned behind the PCI slots, which could cause problems if you have a long card.

There's a full complement of hard-wired ports, including two serial connectors. There's also an onboard sound chip with audio and game ports.

Setup was fairly simple with decent documentation and all the front panel connectors clearly labelled. A bank of dip switches controls the core voltage

supplied to the CPU if you want to overclock your processor, but it could result in a burnt-out chip.

The EPoX has some decent features, but poor layout makes it less attractive.

DETAILS

PRICE £92.82 (£79 ex VAT)
CONTACT Ceratech 01420 85470
www.epox.nl

PROS Fairly cheap; Norton Ghost and Anti Virus supplied

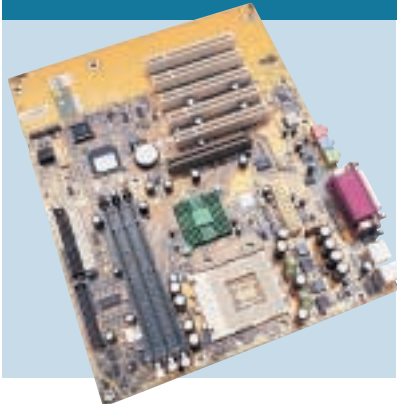
CONS Bad layout makes it hard to install and work with

OVERALL A bit more thought at the design stage could have resulted in a better board

LAYOUT	★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★
OVERALL RATING	★★★

FIC AZ11

AMD



THIS IS A STRANGE looking board from FIC with the bottom quarter of the PCB exhibiting no lines or solder. In fact it looks almost like a micro ATX board with a couple of extra PCI slots stuck on

the bottom. The AZ11 is a rather mediocre motherboard. There are five PCI slots although there's more than enough room for another one. The oddities continue elsewhere with the onboard sound chip sporting audio inputs and outputs, but no game port. There's only one serial port even though there's room for two, and unlike other boards a second port hasn't been supplied on a ribbon cable.

The ATX power connector is just behind the parallel port among a group of capacitors, leaving the power loom to trail across the ZIF socket. Thankfully the EIDE and floppy connectors are on the far right of the board, and FIC has supplied two EIDE cables in the box.

The documentation isn't bad and

you get Norton Ghost, Anti Virus and Virtual Drive in the box which adds some value to the package.

The FIC AZ11 is a disappointing board and with a price of £79 ex VAT, there's better value elsewhere.

DETAILS

PRICE £92.82 (£79 ex VAT)
CONTACT Stac Trading 01788 844 444
www.fic.com.tw

PROS Two EIDE cables supplied

CONS No game port; missing expansion slot; only one serial port

OVERALL A disappointing board that doesn't even redeem itself by being cheap

LAYOUT	★★★★
DOCUMENTATION	★★★
VALUE FOR MONEY	★★
OVERALL RATING	★★★

Gigabyte GA-7ZX

AMD



LIKE GIGABYTE'S FireWire-equipped Socket 370 board, this Socket A offering is also deep blue in colour. The layout is pretty clean with nothing major out of place and all the important areas

unobstructed. The only bad design points are the placement of the modem audio-in connector among the PCI slots and unlabelled front panel connectors. The UltraDMA66 EIDE channels, floppy disk connector and ATX power socket are all located towards the top right.

This board sports Gigabyte's DualBIOS feature, which means that it has two BIOS chips. If something should go wrong the system will then boot from the second BIOS and flash the original one so it is safe to boot from that again.

As well as the AGP slot you get five PCI slots. An ISA and an AMR slot share the bottom backing plate in the system case.

The documentation is of Gigabyte's usual high standard with a clear, comprehensive, well illustrated manual.

Finishing things off is the onboard sound, saving you a bit of cash and an expansion slot. There's no denying that the GA-7ZX is a great VIA KT133 board, but at £93 ex VAT it doesn't come cheap.

DETAILS

PRICE £109.24 (£93 ex VAT)
CONTACT dabs.com
 0800 138 5204 www.gigabyte.com.tw

PROS Good layout; solid documentation; lots of features

CONS Quite pricey for an AMD chip board

OVERALL If you've got the money you won't be disappointed with this board

LAYOUT	★★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★



MSI K7T Pro

AMD



MSI HAS FAIRLY CLOSE links with AMD that generally enable it to get the first boards out for AMD's new chips.

Even though the K7T Pro was the first VIA KT133 Socket A board to hit the

market it's still a very good product. The layout is a little cramped, but none of the main areas are obstructed. Also, the ATX power socket is at the top of the board and the UltraDMA66 EIDE channels and floppy connector are at the far right so the cabling is out of the way.

There are six PCI slots, one of which is shared with a CNR slot and the single AGP slot. There are some rather large capacitors around the ZIF socket, but they don't get in the way when inserting a CPU.

It has onboard sound and all the input connectors are located behind the output ports so the cables don't have to be draped across expansion cards.

Documentation is well presented and easy to follow, but what's really

impressive is the array of diagnostic LEDs on the board. If there's a problem the LEDs indicate exactly where it is.

This is an excellent motherboard with the diagnostic feature setting it a notch above the competition.

DETAILS

PRICE £98.70 (£84 ex VAT)

CONTACT MICROteq
01733 896 667 www.msicomputer.com

PROS Well designed; good documentation; diagnostic indicators

CONS Only two fan connectors

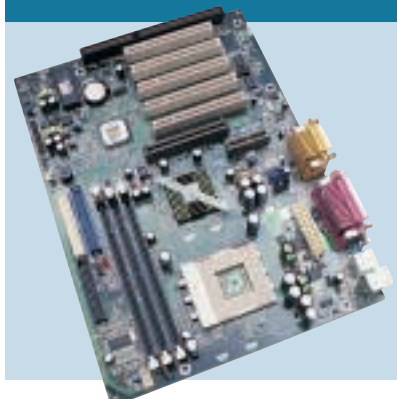
OVERALL An excellent motherboard for Duron and Athlon chips

LAYOUT	★★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★



QDI KinetiZ 7T

AMD



THIS BOARD IS BASED on VIA's KT-133 chipset, so the three DIMM sockets can be filled with PC133 memory. The layout of the board is generally good but the ATX power connector could be

better placed. The two EIDE channels and the floppy drive connector are situated on the right edge of the board, which is more than likely near where the drives themselves will be. Unfortunately, the EIDE controllers are only UltraDMA66 compliant rather than UltraDMA100. There are five PCI slots, although one of them is shared with the single ISA slot. There's also an AMR slot above the AGP connector.

The Socket A CPU connector is easily accessible but as the power connector is behind the serial and parallel ports this might change once a system is built. Strangely, only one of the serial ports is hard-wired to the board even though there is space for two. COM 2 is supplied with a ribbon cable that plugs

into the board. There's also on-board sound. Documentation is fair, and you shouldn't have any problems setting up.

We liked the KinetiZ 7T, but there are better designed boards on offer.

DETAILS

PRICE £84.60 (£72 ex VAT)

CONTACT Swift Tech 01480 433 100
www.qdigrp.com

PROS Decent documentation; fairly easy to set up

CONS Poor location for power connector; only one COM port hard-wired

OVERALL A decent enough Socket A board, but not as good as some

LAYOUT	★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★★

TMC AK74-SC

AMD



THIS SOCKET A board from TMC, based on the VIA KT133 chipset, shares many of the positive aspects of its Socket 370 sibling, although it doesn't share the same price. At £88 ex VAT it

isn't expensive, but it doesn't represent the same value as its stablemate.

The documentation is reasonable and the front panel connectors are also clearly marked and separated for easy installation.

You get five PCI slots, one of which is shared with the single ISA slot, and there is an AMR slot above the AGP slot.

Layout is reasonable with the EIDE and floppy ports on the right-hand edge of the board. Unfortunately the ATX power socket is behind the COM ports adjacent to a bank of capacitors. These capacitors make it a tricky to open the ZIF socket when inserting the processor.

There is an onboard sound chipset with sound and game ports. Both COM ports are wired to the PCB.

In the box you'll find a single UltraDMA66 EIDE cable and the floppy cable along with the driver disc and manual.

The AK74-SC is a competent board, but doesn't rise above the competition.

DETAILS

PRICE £103.40 (£88 ex VAT)

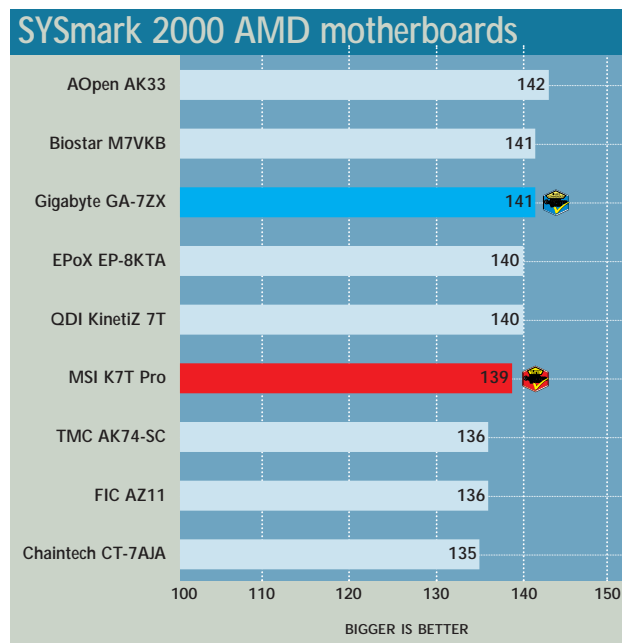
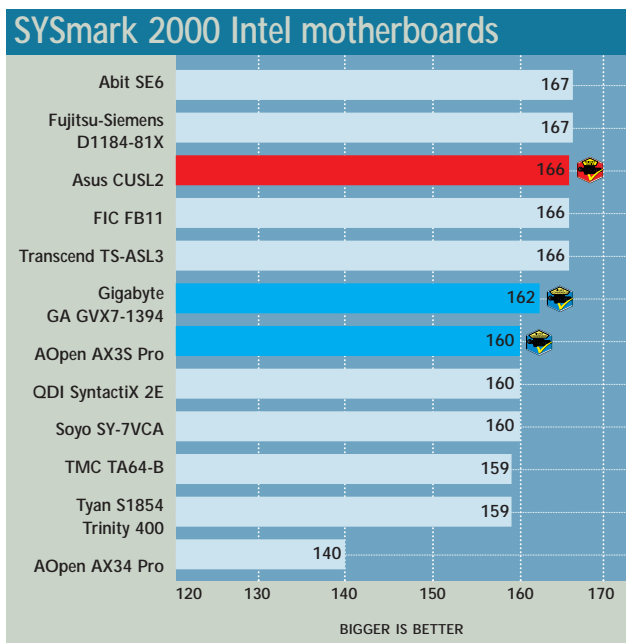
CONTACT TMC Technology 01438 842 300
www.tmc-uk.com

PROS Decent documentation; well placed EIDE connectors

CONS Poor placement of ATX power connector; capacitors hinder ZIF socket

OVERALL Not a bad board, but nothing special either

LAYOUT	★★★
DOCUMENTATION	★★★★
VALUE FOR MONEY	★★★★
OVERALL RATING	★★★



How we evaluated the motherboards

To test the motherboards we ran them through our SYSmark benchmarking suite. SYSmark is made up of several office-based applications that simulate the everyday use a PC is subjected to. The applications employed by SYSmark include CorelDraw 9; Corel Paradox 9; Microsoft's Word 2000, Excel 2000 and PowerPoint 2000; Dragon Naturally Speaking Preferred 4; Netscape Communicator 4.61; Adobe Premiere 5.1; Adobe Photoshop 5.5; Avid Elastic Reality 3.1; MetaCreations Bryce 4; and Microsoft Windows Media Encoder 4. Automated scripts are run on each application and timed, giving an indication of a PC's speed. We decided not to run 3D tests since this would be testing the graphics card rather than the motherboard.

As we were not testing complete PCs, we had to make sure that each motherboard was put on a level playing field, so the same peripherals were used for every board, with the

only differing factor being the AMD and Intel CPUs.

For the AMD boards we used a 700MHz Athlon Thunderbird chip with 256KB of full-speed Level 2 cache and for the Intel motherboards we used an 866MHz Coppermine Pentium III, again with 256KB of full-speed Level 2 cache. Therefore, the AMD and Intel boards are comparative only to themselves since different speed CPUs were employed.

To keep things as cutting edge as possible we used UltraDMA100-compatible hard disks supplied by Maxtor. These 7,200rpm units represent the pinnacle of EIDE technology and allowed the motherboards that supported the UltraDMA100 standard to make use of the enhanced burst transfer rate. Each board was also tested with the EIDE cable included in the box.

For system memory we used 128MB of PC133 SDRAM on a single DIMM module, which we considered optimum for the majority of PC applications.

Graphics were provided by ATI Rage 128 Pro AGP cards and, although not cutting edge, these were more than adequate for comparing the motherboards with each other.

With each new board the hard disk was formatted and Windows 98 SE was reinstalled from scratch. After the Windows installation SYSmark was installed and run, so that every test was performed under exactly the same conditions.

As the graphs above show there is only a very small difference in performance between the motherboards on test. Because of this, performance was only a small factor in our evaluation of each board. Installing a motherboard is a major operation and a manufacturer can do a lot at the design stage to make your life either easier or more difficult. The board's layout can not only affect how easy it is to install, but also how tidy, or untidy the inside of your PC is when built. We therefore factored the layout into our evaluation.

Another major factor is the documentation. Some manufacturers supply next to no paper documentation for a board and put the full manual on a CD. This may be environmentally friendly, but the chances are that if you're building a PC from the bottom up you won't have access to a CD-ROM drive. We considered clear, detailed documentation to be of great importance and the boards were rewarded or chastised accordingly.

Finally we looked at value for money. We considered the features and whether the package justified the price. It didn't necessarily follow that the cheapest board offered the best value. Sometimes it's worth spending that little bit more to get a superior product.

Of course, buying a motherboard is subjective to some extent. If you need a specific number of PCI slots, or require onboard sound and video then your search will be narrowed, but whatever your criteria this test should make your choice easier.



Table of features: Intel boards



MANUFACTURER	ABIT	AOPEN	AOPEN	ASUS	FIC
PRODUCT	SE6	AX34 PRO	AX3S PRO	CUSL2	FB11
Price inc VAT (ex VAT)	£116 (€99)	£86.59 (€73.70)	£113.66 (€96.38)	£136.30 (€116)	£69.32 (€59)
Supplier	dabs.com	RK Distribution	CMS Computers	dabs.com	Stac Trading
Telephone	0800 138 5204	01844 216 226	0151 709 0900	0800 138 5204	01788 844 444
MOTHERBOARD FEATURES					
Processor type	Socket 370	Socket 370	Socket 370	Socket 370	Socket 370
Chipset	i815E	VIA 133A (694X)	i815E	i815E	Intel 440BX
DIMM slots/max RAM	3/512MB	3/1.5GB	3/512MB	3/512MB	4/1GB
Front-side bus speeds	66/100/133	66/100/133	66/100/133	66/100/133	66/100/133
AGP/AGP Pro/PCI	1/0/5	1/0/3	1/0/4	0/1/5	1/0/4
AMR/CNR/ISA	0/0/0	1/0/0	0/0/0	0/1/0	0/0/1
Shared	PCI/CNR	PCI/ISA	PCI/CNR	PCI/CNR	PCI/ISA
PS/2/USB/serial/parallel ports	2/2/1/1	2/2/2/1	2/2/1/1	2/2/1/1	2/2/2/1
Additional USB ports included/optional/total	0/2/4	2/0/4	2/0/4	3/2/7	0/0
Onboard VGA/sound	✓/✓	✗/✓	✓/✓	✓/✗	✗/✗
EIDE channels	2	2	2	2	2
UltraDMA33/66/100	✓/✓/✓	✓/✓/✗	✓/✓/✓	✓/✓/✓	✓/✗/✗
Wake on LAN/ring	✓/✗	✓/✓	✓/✓	✓/✓	✓/✗
Other connectors	IrDA/COM 2 Thermal sensor	IrDA	IrDA	IrDA/Intrusion/LCD or TV out/COM 2	IrDA/PCI Audio Card (SB Link)
BIOS type	Award	Award	Award	Award	Award
No of fan connectors	3	2	3	3	2
Jumperless/soft BIOS	✓	✓	✓	✓	✗
Manual memory speed setting	✓	✓	✓	✓	✗
Onboard speaker	✓	✗	✗	✗	✗
Other	COM 2 lead provided	Die Hard BIOS (2x BIOS)	Die Hard BIOS (2x BIOS)	COM 2 lead provided	N/A

Table of features: AMD boards

MANUFACTURER	AOPEN	BIOSTAR	CHANTECH	EPoX
MODEL	AK33	M7VKB	CT-7AJA	EP-8KTA
Price inc VAT (ex VAT)	£96.22 (€81.89)	£92.82 (€79)	£92.82 (€79)	£92.82 (€79)
Supplier	RK Distribution	Simply	evesham.com	Cerotech
Telephone	01844 216 226	0870 727 4020	0800 038 0800	01420 85470
MOTHERBOARD FEATURES				
Processor type	AMD Duron/Athlon	AMD Duron/Athlon	AMD Duron/Athlon	AMD Duron/Athlon
Chipset	VIA KT133	VIA KT133	VIA KT133	VIA KT133
DIMM slots/max RAM	3/1.5GB	3/1.5GB	3/1.5GB	3/1.5GB
Front-side bus speeds	100MHz DDR	100MHz DDR	100MHz DDR	100MHz DDR
AGP/AGP Pro/PCI	1/0/5	1/0/4	1/0/4	1/0/5
AMR/CNR/ISA	0/0/0	1/0/0	1/0/0	0/0/0
Shared	None	PCI/ISA	PCI/ISA	PCI/ISA
PS/2/USB/serial/parallel ports	2/2/1/1	2/2/2/1	2/2/2/1	2/2/2/1
Additional USB ports included/optional/total	0/2/4	2/0/4	0/2/4	0/2/4
Onboard VGA/sound	✗/✓	✗/✓	✗/✓	✗/✓
EIDE channels	2	2	2	2
UltraDMA33/66/100	✓/✓/✗	✓/✓/✗	✓/✓/✗	✓/✓/✗
Wake on LAN/ring	✓/✗	✓/✗	✓/✗	✓/✗
Other connectors	IrDA/COM 2/Thermal Sensor x2	IrDA	IrDA/Intrusion	IrDA
BIOS type	Award	Award	Award	Award
No of fan connectors	2	2	2	3
Jumperless/soft BIOS	✓	✓	✓	✗
Manual memory speed setting	✓	✓	✗	✓
Onboard speaker	✗	✗	✗	✗
Other	COM 2 lead provided	N/A	TwinBIOS	N/A



FUJITSU-SIEMENS	GIGABYTE	QDI	SOYO	TMC TECHNOLOGY	TRANSCEND	TYAN
D1184-81X	GA GVX7-1394	SYNTACTIX 2E	SY-7VCA	TA64-B	TS-ASL3	TRINITY 400
£129.25 (€110)	£111.62 (€95)	£108.10 (€92)	£73 (€62.12)	£81 (€69)	£124.55 (€106)	£81.07 (€69)
AGP Distribution	dabs.com	Swift Tech	CCL Computers	TMC Technology	Vortex Services	Simply
01794 528 000	0800 138 5204	01480 433 100	01274 269 001	01438 842 300	0161 343 5555	0870 727 4020
Socket 370	Socket 370	Socket 370	Socket 370	Socket 370 or Slot 1	Socket 370	Socket 370 or Slot 1
i815	VIA 133A (694X)	i815E	VIA 133A	VIA 133A (694X)	i815E	VIA 133A
3/512MB	3/1.5GB	3/512MB	3/1.5GB	3/1.5GB	3/512MB	3/768MB
66/100/133	66/100/133	66/100/133	66/100/133	66/100/133	66/100/133	66/100/133
1/0/5	1/0/4	1/0/5	1/0/4	1/0/4	1/0/5	1/0/5
1/0/0	1/0/0	0/0/0	1/0/0	0/0/0	0/0/0	0/0/0
None	PCI/ISA	PCI/CNR	PCI/ISA	PCI/ISA	PCI/CNR	PCI/ISA
2/2/1/1	2/2/2/1	2/2/1/1	2/2/2/1	2/2/2/1	2/2/1/1	2/2/2/1
0/2/4	0/2/4	0/2/4	0/2/4	0/0/2	0/2/4	0/0/2
✓/✓	✗/✗	✓/✓	✗/✓	✗/✗	✓/✓	✗/✗
2	2	2	2	2	2	2
✓/✓/✗	✓/✓/✗	✓/✓/✓	✓/✓/✗	✓/✓/✗	✓/✓/✓	✓/✓/✗
✓/✗	✓/✓	✓/✓	✓/✗	✓/✓	✓/✗	✓/✓
Intrusion/PSU monitoring/COM 2	IrDA	IrDA/COM 2/ SMBus/Intrusion	IrDA	IrDA	IrDA/COM 2/ modem	None
Phoenix	AMI	Award	Award/Phoenix	Award	Award	Award
2	3	3	2	3	3	4
✓	✗	✓	✓	✗	✓	✗
✗	✓	✓	✓	✗	✓	✓
✗	✓	✗	✗	✗	No	Yes
N/A	3x FireWire, Video/Wavell SE	COM 2 lead provided	N/A	N/A	COM 2 lead provided	N/A



FIC	GIGABYTE	MSI	QDI	TMC
AZ11	GA-7ZX	K7T Pro	KINETIZ 7T	AK74-SC
£92.82 (€79)	£109.24 (€93)	£98.70 (€84)	£84.60 (€72)	£103.40 (€88)
Stac Trading	dabs.com	MICROteq	Swift Tech	TMC Technology
01788 844 444	0800 138 5204	01733 896 667	01480 433 100	01438 842 300
AMD Duron/Athlon	AMD Duron/Athlon	AMD Duron/Athlon	AMD Duron/Athlon	AMD Duron/Athlon
VIA KT133	VIA KT133	VIA KT133	VIA KT133	VIA KT133
3/1.5GB	3/1.5GB	3/1.5GB	3/1.5GB	3/1.5GB
100MHz DDR	100MHz DDR	100MHz DDR	100MHz DDR	100MHz DDR
1/0/5	1/0/5	1/0/5	1/0/4	1/0/4
0/0/0	0/0/0	0/0/0	1/0/0	1/0/0
None	ISA/AMR	PCI/CNR	PCI/ISA	PCI/ISA
2/2/1/1	2/2/2/1	2/2/2/1	2/2/1/1	2/2/2/1
0/2/4	0/2/4	0/2/4	0/2/4	0/2/4
✗/✓	✗/✓	✗/✓	✗/✓	✗/✓
2	2	2	2	2
✓/✓/✗	✓/✓/✗	✓/✓/✗	✓/✓/✗	✓/✓/✗
✗/✗	✓/✓	✓/✓	✓/✓	✓/✓
Novus II	IrDA	IrDA	IrDA	IrDA
Award	AMI	Award	Award	Award
3	3	2	3	3
✗	✓	✓	✓	✓
✓	✓	✓	✓	✗
✗	✗	✓	✓	✗
No game port	DualBIOS	AGP support braces	COM 2 lead provided	N/A



Editor's Choice

The motherboard is one of the most important components in your PC, so choosing the right one is paramount. In our round-up we found some truly impressive boards and some very disappointing ones. We were amazed at some of the designs and very surprised to see that some boards had practically no paper documentation.

As the graphs show there's very little difference in performance, so speed isn't a major factor. Instead we considered how easy it would be to install and configure each board and how tidily a PC could be built from each one.

The winners

Since we looked at a great many boards, we came up with quite a few winners. The test was split in two, boards for Intel chips and boards for AMD chips. The **Editor's Choice** for the Intel category is the Asus CUSL2. Even though it is the

most expensive, it is of such high quality that it had to win. The Asus is well laid out and sports six PCI slots and two CNR slots. It is also the only board that had an AGP Pro slot rather than the standard AGP slot. The documentation is first rate and setting up the board was simple. Ultimately, the Asus CUSL2 is the cream of the 815E motherboard crop.

The AOpen AX3S Pro wins the first **Highly Commended** award. This is also a great board with decent layout and superb documentation. As well as on-board sound and graphics, it sports a backup BIOS design so that you can flick a switch and boot from a safe BIOS if your default BIOS gets corrupted and it's one of only three boards in the test to ship with two EIDE cables instead of one.

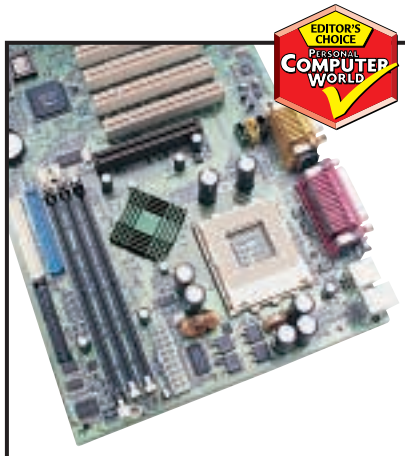
The second **Highly Commended** award in the Intel category goes to the Gigabyte GA-GVX7-1394. This board is based on the VIA 694X chipset rather

than the Intel 815E which means you have a limit of 1.5GB of memory rather than the 512MB of the 815E, assuming you can afford that much RAM. However, what makes this board special is that it has three FireWire ports hard-wired to it, making it ideal for anyone involved in digital video editing. In fact, with a price of only £95 ex VAT it's cheaper than a lot of FireWire expansion cards. As well as having a decent layout and a solid manual, you also get a copy of MGI's VideoWave III.

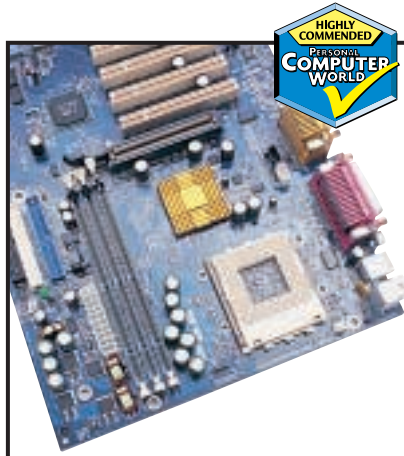
In the AMD category the **Editor's Choice** goes to the MSI K7T Pro. This was one of the first Socket A boards and it's still holding its own among its peers. The layout is excellent with all the ribbon and power connectors placed so that no cables drape across the board. There are six PCI slots with one sharing a backing plate with the CNR slot. All the inputs for the onboard sound chipset are placed behind the external audio ports. The manual is clear and comprehensive and an array of diagnostic LCDs makes it easy to track down any problems.

The **Highly Commended** award in the AMD camp goes to Gigabyte for its GA-7ZX. Based on the VIA KT133 chipset, it has an excellent layout. The EIDE, floppy and ATX power socket are all located at the top right of the PCB. There are five PCI slots with single ISA and AMR slots sharing the bottom backing plate and it also has the DualBIOS feature. It may be expensive, but it's worth considering.

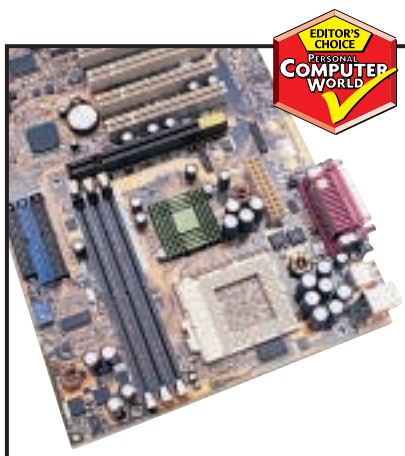
Finally we'd like to thank ATI, Atlas, Intel, Maxtor and Panrix for supplying us with the equipment used for this test.



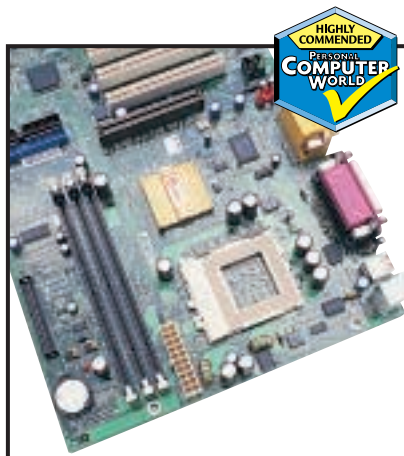
The layout of MSI's board is excellent



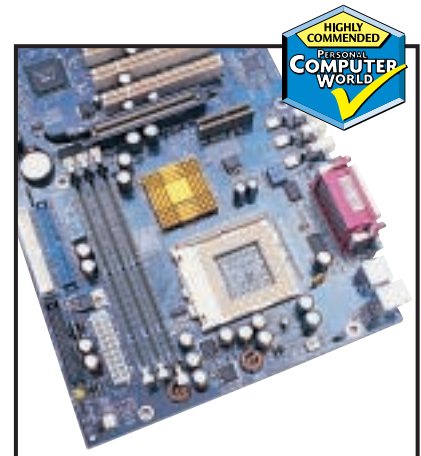
The GA-7ZX offers a DualBIOS feature



Asus' CUSL2 is the cream of the crop



AOpen's AX3S Pro runs a close second



The GA-GVX7-1394 includes FireWire

Building a network for a small office need not be complex and to prove it we've gathered together seven starter kits to see how easy they are to install and use

Easy

Many small businesses are now realising that networking their PCs will make better use of their IT resources and can play a key role in keeping them ahead of the competition. Although many will have a number of employees using PCs, they will have no means of sharing information and resources. In this environment the only sharing likely to occur is via the 'sneakernet' – copying a file onto a floppy disk, walking over to a colleague's desk and handing the disk to them.

This is time consuming, unproductive and tedious at best. Sharing resources such as files and printers across a network can increase productivity and bring big savings. The SOHO (Small Office Home Office) market has been growing rapidly over the past few years and is a sector that can benefit hugely from networks. However, many people view networks as complex beasts that need technical staff to install and maintain them. Fortunately, many IT manufacturers have recognised this problem and now offer networking kits that are designed to be simple to install and use.

In this month's group test we take a look at seven of these kits that offer a wide range of options. The most basic provides enough hardware to get two PCs connected over a simple Ethernet network. We'll be looking at products that allow PCs to be networked using USB ports, offer Internet connection sharing and higher-end systems that provide a small server for centralising all your data. All are designed to be simple to install and configure and come with clear instructions to guide you gently through the entire process. Some offer support for both Ethernet and Fast Ethernet and come with a hub or a switch, so we'll be explaining how they work and which is the best choice for your business.



networks

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• Products tested and reviewed by Dave Mitchell

PHOTOGRAPH PATRICK LLEWELYN DAVIES

3Com AirConnect Starter Pack



SMALL COMPANIES LOOKING for an out-of-the-box wireless LAN (WLAN) solution may find 3Com's AirConnect Wireless LAN Starter Pack offers all they need. When the latest IEEE 802.11b High Rate specification was ratified in late 1999, 3Com was quick off the mark with support for the new standard. Four speeds are available – 1, 2, 5.5 and 11Mbps/sec and are designed to allow wireless products to use a feature called dynamic rate shifting so they can adjust their operating speed to counteract poor conditions such as interference. This will affect the operating range, which depends on the connection speed. For outdoor use this is 33m, but in the office 11Mbps/sec only stretches to 26.6m while 5.5Mbps/sec increases this to 40m.

The Starter Kit comprises three wireless PC Cards plus a base station, so you have everything you need to provide laptop users with full network access. PCs can also be included in the WLAN by using a special PCI card that provides a slot for inserting a wireless PC Card, although these were not available at the time of writing.

All wireless PC Cards operate in two modes. Ad-hoc mode supports a peer-to-peer connection between users, so that, for example, a group of three laptop users running in this

mode can see each other, but do not have access to the company network. Infrastructure mode provides full access to the network, but requires the base station. 3Com's base station is a

compact unit with a chunky plastic aerial that flips up at the back.

At the rear is a 10BaseT port for connection to a network hub or switch, plus a serial port for a direct link to a PC for configuration using terminal emulation software, such as Windows HyperTerminal. Build quality is not

particularly good, though, as there are two small wires at the back that connect to the aerial assembly loop in front of each port and need to be moved aside to gain access. The aerial on the AirConnect card isn't fixed firmly to the PC Card body, either, so care must be taken to avoid damaging it.

Installing the PC Cards is simple enough, as our Win98 test laptop identified them correctly on insertion. There are plenty of troubleshooting utilities and tools provided as a Launcher application loads in the background. Selecting this brings up a small window that shows the connection status and general card settings. The AirConnect card supports

two different power modes prolonging laptop battery life. They can detect whether the laptop is running on mains or battery supply and will automatically select the most appropriate mode.

You'll need to set up a serial port link to the base station for initial configuration, but 3Com provides a suitable cable and there's plenty of help in the online manual. Once you've assigned it an IP address you can move over to management using a standard web browser. Here, you'll find access to all the base station's settings and you can monitor who is currently logged on. A special PowerBaseT adaptor is included that allows the base station to be positioned some distance from a power outlet as it uses a standard eight-wire network cable to provide it with power and a network link.

Installation may be easy enough, but general performance falls well short of the quoted top speed. We copied a variety of files from our laptop to a PC on the main network and saw top speeds of only 3.4Mbps/sec. There are a number of reasons for this. First, the Ethernet port on the base station is only the 10BaseT variety so 11Mbps/sec speeds are simply not possible. All WLAN products use the Ethernet CSMA/CA protocol that starts to fade above 80 per cent of available bandwidth, as it will be continually monitoring packet collisions and waiting to send data. The general Windows network protocol overheads take their toll as well. The bottom line is that users are unlikely to see speeds above 5Mbps/sec for real-world wireless operations.

Even so, the AirConnect is more than three times faster than older 2Mbps/sec wireless products, as these delivered speeds in the region of 1Mbit/sec for general use. As a complete package the AirConnect also looks good value as it provides enough hardware to get three users up and running and provides full network access as well.

SPECIFICATIONS

INTERNET CONNECTION SHARING

No

NETWORK CARDS

Number supplied: 3
Interface: Type II PC Card

NETWORK HUB

Model: AirConnect Wireless Base Station
No. of ports: N/A

NETWORK CABLES

No. supplied: N/A
Type: N/A

DETAILS

PRICE £1,315 (£1,119 ex VAT)

CONTACT 3Com 0800 225 252

www.3com.com

PROS Easy installation with everything included for full wireless network access

CONS Build quality below par and disappointing performance

OVERALL An all-in-one wireless networking kit that's easy to install and use and offers good value, although performance for general use is well below the quoted top speed

BUILD QUALITY

FEATURES

VALUE FOR MONEY

OVERALL RATING

★★
★★★★
★★★★
★★★

Compaq NeoServer 150 Internet



COMPAQ'S NEOSERVER 150 Internet Plus provides a low-cost, simplified server solution for companies with limited IT knowledge. Along with basic file sharing it offers shared Internet access, email facilities, the option to create your own intranet site and yet aims to be configured inside of 15 minutes after the user has answered a few simple questions. It runs a scaled-down version of SCO Unix with a 100-user licence. Compaq claims this is easier to use than Microsoft's NT Server or Novell NetWare, as these network operating systems can be overly complex for the target market.

However, you don't need to be a Unix expert to use the NeoServer, as all administration is carried out using a standard web browser from a networked workstation. At the rear are the usual mouse, keyboard and monitor interfaces, but these have been covered up with a blanking plate so you only use the power socket, network connection and, in the case of the Internet Plus model on review, the modem port.

The NeoServer is clothed in a compact mini-tower chassis with two 5.25in bays at the front for removable hard disk carriers. One comes pre-installed with a 17GB Seagate EIDE drive which can be used either as extra

storage or to back up the contents of the internal 13GB drive. Backup is always an important consideration, but we're not convinced this is the best method, as the removable drive can only be taken out with the server powered down, so it's likely to be left in place rather than be stored in a secure location.

The hardware specification is fairly good for the price and consists of an Intel Celeron 500MHz processor accompanied by 64MB of memory spread across a pair of DIMM sockets. The latter can be upgraded by sliding the motherboard carrier out from the rear, but we found it difficult to get the assembly back inside

the chassis. We weren't impressed with the location of the power button either, as this sits in a small recess on the top panel and is all too easily activated by a misplaced hand, although, if pressed, it does initiate a controlled shutdown. Four PCI slots are provided with two occupied by a Compaq dual-speed network adaptor and a 56K V.90 modem card. The network connection is completed by an eight-port Compaq HB111 hub, although this is only of the 10BaseT variety and will need replacing if you want to move up to Fast Ethernet.

You also get a pair of cables – one for connecting the NeoServer to the hub and the other for the administration workstation. You'll have to source

network cards and cabling for the rest of your users, as the NeoServer package doesn't include any.

We found the NeoServer easy to set up and use. The documentation is particularly good, as it covers almost every angle with clear overviews of networking principles and detailed instructions for setting up the first PC for network connection. Software configuration is dealt with by a utility supplied on CD-ROM – just load the disc and follow the instructions. Your web-browser home page is automatically set to the NeoServer, so you'll see the main Control Centre administration screen as soon as you load it. Enter a username and password, choose a letter for the shared drive, select the country and language, enter your ISP details and away you go.

The same CD-ROM is used to configure the network and browser settings on each workstation and IP addresses are dished out by the NeoServer's DHCP (dynamic host configuration protocol) services. New user accounts are easily added and each gets a personal folder on the server's hard disk that can be mapped to a local drive.

Internet connections are started as soon as the NeoServer spots an IP address that is not bound for the local network. Once a link to your chosen ISP has been made, all users with sufficient rights can share the connection and unwanted visitors are deterred by the NeoServer's built-in firewall. Server backup is a two-button affair and can be scheduled or run on demand. To restore files you view the contents of the backup drive from the Control Centre and select those you want returned to active duty. The Recycle Bin can also be controlled from here and emptied after a specified number of days have passed.

The NeoServer 150 package is a good choice for small companies that want a network server along with shared Internet access and email but don't want the hassle and additional costs of setting up a network operating system. As a complete solution it is well priced and is very easy to install and use.

SPECIFICATIONS

INTERNET CONNECTION SHARING
Yes

NETWORK CARDS
Number supplied: None
Interface: N/A

NETWORK HUB
Model: Compaq HB111
No. of ports: 8

NETWORK CABLES
No. supplied: 2
Type: Category 5

DETAILS

PRICE £1,127 (£959 ex VAT)
CONTACT Compaq 0845 270 4000
www.compaq.com

PROS Remarkably easy to set up and use; good documentation

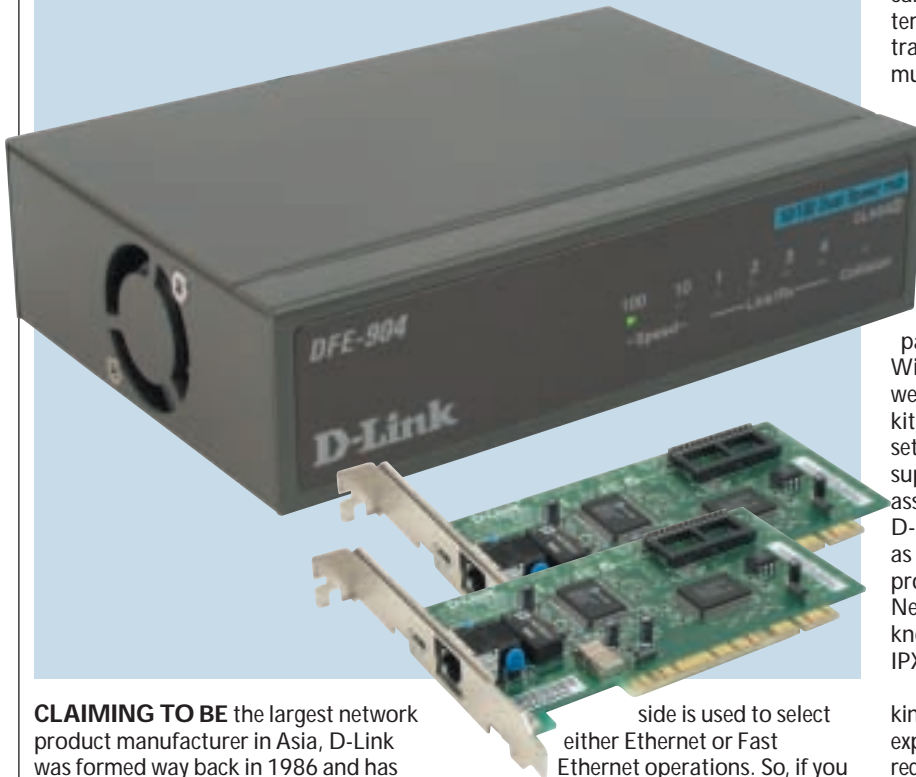
CONS Can't attach a printer to the server; supplied hub is only 10BaseT

OVERALL A good solution offering shared storage; Internet access and email facilities

BUILD QUALITY ★★
FEATURES ★★
VALUE FOR MONEY ★★
OVERALL RATING ★★



D-Link Network Kit DFE-905



CLAIMING TO BE the largest network product manufacturer in Asia, D-Link was formed way back in 1986 and has its finger in just about every networking pie there is. It recognised the value of the SOHO networking market before many other manufacturers and has always had a comprehensive range of budget-priced products to suit. The DFE-905 is its network-in-a-box offering and supports both Ethernet and Fast Ethernet operation. The kit supplies all you need to get a pair of PCs networked and talking to each other and comes with two dual-speed PCI network cards, a four-port hub, two 6m lengths of Category 5 cabling and plenty of manual-related help.

The DFE-904 dual-speed hub has to be one of the smallest we've seen, as it measures a miniscule 11 x 3 x 7.5cm (w x h x d). Referred to as a 'hubby' by D-Link, it's cloaked in a solid steel case and the company has even managed to fit a cooling fan in one side. The front panel provides plenty of status info with a link status and activity LED for each port along with collision detection and speed selection indicators.

An important consideration with the DFE-904 is that it does not support both 10 and 100Mbps/sec operations simultaneously and a tiny switch at the

side is used to select either Ethernet or Fast Ethernet operations. So, if you have even one device that only supports the lower speed, all connected devices must drop to this speed as well.

At the rear you'll find five RJ-45 sockets. However, two of these sockets are used for port four. This is because one socket acts as a standard connector for attaching a PC to the network and the other as an uplink port for cascading other hubs. Connecting to one of these sockets disables the other, so you cannot use both at the same time. D-Link gets a pat on the back for its hub manual as it

provides plenty of instructions on how best to use it. Various different networking scenarios in which the hub can be used are covered in some depth and Ethernet limitations on cable lengths and the maximum number of segments allowed are explained clearly.

The DFE-530TX cards are dual-speed adaptors that support both 10BaseT and 100BaseTX operations. These are terms that refer to the different types of network standards as specified by the IEEE (Institute of Electrical and Electronics Engineers) governing body. 10BaseT is a 10Mbps/sec baseband network that uses twisted-pair cables. Baseband simply refers to a network that transmits

data digitally, but each wire can only carry one signal at a time. The other term, broadband, describes analog transmissions over a wire that can carry multiple signals at the same time, such as cable TV. 100BaseTX is a 100Mbps/sec baseband network that uses twisted-pair wires but the signals from the sender's transmit wire cross over to the recipient's receive wire – a function carried out within a hub or switch.

We found the cards were simple enough to install and a small pamphlet provides a few tips on Windows networking. However, as we've found with a number of starter kits, when it comes to installing and setting up network protocols, the supplied documentation tends to assume a certain level of knowledge. D-Link is particularly vague on this topic as the pamphlet asks you to select the protocols you want to use from the Network panel in Windows. Would you know whether you needed NetBEUI, IPX/SPX compatibility or TCP/IP?

The network adaptors are typically the kind of quality hardware we've come to expect from D-Link over the years and we regularly recommend them along with the likes of Intel and 3Com cards. Our experience has shown that cheap unbranded network cards can be a big problem as they frequently cause installation problems and resource conflicts and rarely come with any worthwhile support. The D-Link cards have three indicators on their backplate showing link speed and activity that can be useful for troubleshooting. They also support auto-negotiation so, if the D-Link hub has been set to run at 100Mbps/sec, the cards will sense this on connection and will automatically configure themselves to run at the higher speeds.

Overall, the D-Link Network Kit offers a good entry point into the world of networking with the added bonus of support for both Ethernet and Fast Ethernet. It's a pity the hub doesn't support both speeds simultaneously, but you can always upgrade it later on if you feel this is a worthwhile investment.

SPECIFICATIONS

INTERNET CONNECTION SHARING
No

NETWORK CARDS

Number supplied: 2
Interface: PCI

NETWORK HUB

Model: DFE-904
Number of ports: 4

NETWORK CABLES

Number supplied: 2
Type: Category 5

DETAILS

PRICE £106 (£90 ex VAT)

CONTACT D-Link 020 8235 5555

www.dlink.co.uk

PROS Support for 10/100BaseTX and reasonable documentation

CONS Hub doesn't support both network speeds simultaneously

OVERALL A good value solution for networking two PCs over Ethernet or Fast Ethernet

BUILD QUALITY ★★★★★

FEATURES ★★★★★

VALUE FOR MONEY ★★★★★

OVERALL RATING ★★★★★

D-Link Phoneline USB Adapter



NO DOUBT MANY small businesses are looking to the benefits of networking their PCs but may not be too keen on the idea of having network cabling snaking around the office or home or having to dismantle their systems to install network cards. It was inevitable that vendors would look to the USB port as a means of networking PCs and D-Link's 10MB Phoneline USB Adapter DHN-120 aims to do just that. Although not a starter kit in the strictest sense, the D-Link USB solution does offer a number of useful features for those looking for the simplest of networking solutions. Along

with a Plug and Play installation that doesn't require the PC's lid to be removed, it uses existing phone lines to transmit data, so no further cabling work is necessary. The USB adaptor supports the latest HomePNA2.0 (Home Phoneline Networking Association) specification that was completed at the end of 1999. This offers some big performance-related improvements over the original HomePNA1.0 specification as it increases performance tenfold to 10Mbps/sec, bringing it in line with standard Ethernet speeds and making it far more suitable for office networking. The specification is designed to allow PCs to be connected over a maximum

distance of 300m. Expansion options are almost limitless as up to 50 devices can be connected over the phone lines although, beyond this, performance is likely to suffer. It offers all the same features as a standard network so you can share files, printers and Internet connections. Furthermore, the lines can

still be used for normal phone calls and older HomePNA1.0 devices will work with the latest products as well. D-Link's USB adaptor is a tiny palm-sized slab of clear plastic with three LED indicators at the front showing power and link status, along with network activity. At

the rear is a standard USB port plus two RJ-11 sockets for phone line and handset connection. The adaptor draws power from the USB port, so there are no bulky transformers to worry about. For testing we installed one adaptor on a PC running Windows 2000 Professional and another on a Win98 SE system. Hardware installation in both cases was simple enough, as you just plug the adaptor in, wait for the system to identify it and load the drivers from the supplied CD-ROM. Phone line connection will be a problem, though, as the supplied cable is terminated at both ends with the smaller RJ-11 sockets. D-Link doesn't provide RJ-11 to BT convertor plugs so, before the USB

adaptors can be used, you'll have to source these yourself. Software installation shouldn't cause too many headaches, as the supporting documentation is extremely good. Along with a browser-based guide on the CD-ROM, you also get a decent manual that covers virtually every installation angle and procedures for both Windows 98 and 2000 are included. It guides you gently through the process of setting up your workgroup making no assumptions along the way. The section on the TCP/IP protocol settings is excellent as it shows clearly how to provide each PC with a permanent (static) IP address and supports this with plenty of screenshots. File and printer sharing comes next, but the manual chickens out on showing how to share an Internet connection.

Once your PCs are connected to the phone line, the activity LED on each device should flash to show it is receiving or transmitting data and we achieved a connection between our test PCs on our first attempt. So far so good, but performance proved to be a big let-down. Copying 121MB of Win98SE cab files from one PC to the other took nearly 11 minutes 30 seconds for a transfer rate of 1.4Mbps/sec. This improved marginally to 1.5Mbps/sec when we copied a single 73MB .avi file but dropped to 1.3Mbps/sec for 86MB of documents and spreadsheets.

Although performance is nowhere near the quoted figures, it should be enough for small offices indulging in simple file and printer sharing with minimal traffic between PCs. If you're expecting traffic volumes to be higher, then the only alternative is to install Ethernet or Fast Ethernet. At £125, the DHN-120 is also comparatively expensive, as you could set up a basic Ethernet network for less money. Overall, the factors in favour of D-Link's USB networking solution are the simplified installation, no extra cabling needs and the ability to expand the network easily over existing phone lines.

SPECIFICATIONS

INTERNET CONNECTION SHARING
No

NETWORK CARDS
Number supplied: 1
Interface: USB

NETWORK HUB
Model: N/A
Number of ports: N/A

NETWORK CABLES
Number supplied: 2
Type: USB cable/phone cable

DETAILS

PRICE £147 (£125 ex VAT)
CONTACT D-Link 020 8235 5555
www.dlink.co.uk

PROS Easy to use; plenty of expansion and good documentation
CONS Poor performance and costly
OVERALL The easiest way to set up a network using your internal phone lines, but low on speed and expensive

BUILD QUALITY ★★★
FEATURES ★★
VALUE FOR MONEY ★
OVERALL RATING ★★

Farallon Internet Sharing Starter Kit



FARALLON MOVED INTO the small network arena mid-1999 with the release of its Internet Sharing Starter Kit (ISSK) which is aimed at home users and small offices looking to create a simple network, but with the added bonus of sharing a single Internet connection. However, the ISSK is only of any use if you're just planning to network a couple of PCs. The kit comprises two of Farallon's EtherWave PCI network cards, two short lengths of Category 5 network cable, a five-port hub and a two-user copy of Vicomsoft's SurfDoubler TCP/IP routing software. The software is only designed to allow

an Internet connection on a PC to be shared with one other networked PC and cannot be upgraded. If you want the connection to be shared among more PCs, Farallon does offer an option to trade in the SurfDoubler software and redeem its value against Vicomsoft's SoftRouter Plus software.

Although we found installing the ISSK very easy, some users may have problems, as Farallon only provides separate booklets for each piece of hardware. The network cards are poorly covered and the model referred to in the manual is not the same as that supplied with the kit. There's nothing to help with network configuration either, so you're on your own when it comes to installing

and setting up TCP/IP. The EtherWave cards themselves are unexciting as they are only the basic 10BaseT variety. A single RJ-45 port provides the network connection and is supported by link status and activity LEDs which could prove useful for troubleshooting. However, if you

think you may move to Fast Ethernet in the future, these cards will have to be replaced for dual-speed versions. The Starlet/5 hub is a basic plastic box with five 10BaseT ports at the rear and a switch alongside port one allows it to function as a normal network port or as an uplink for cascading another

hub. At the front is a row of LEDs showing link status and activity for each port and one showing detected collisions. A small guide is provided, although there's little to do here other than switch the hub on and connect each user to it.

SurfDoubler acts as a router as it identifies IP traffic that is not for a system on the local network and automatically opens a connection with your chosen ISP. Further outbound Internet traffic is routed to the ISP while incoming traffic is sent through to the local network and on to the client that requested it. The software allows the connection to be shared as it uses a feature called NAT (Network Address

Translation) where all local IP addresses are mapped to the Internet address provided by the ISP. This has an added security bonus, as all PCs on the local network are hidden behind the router ensuring that their addresses are never allowed onto the Internet.

Installing the SurfDoubler software on our Win98 test system proved to be reasonably simple. Once the software is loaded, it fires up a wizard-based utility that leads you through each step. If you already have a Windows Dial-Up Networking profile configured it will offer to use these settings or help create a new profile. It supports DHCP (Dynamic Host Configuration Protocol) so it can dish out local IP addresses to both PCs and the wizard shows where in the Networking Properties you need to go to select this. One area where we would have liked to have seen more help was with client configuration. For the second PC to be able to access the system running the SurfDoubler software it needs the IP address of the host's network card entered as a gateway, but there was very little information provided about how this is carried out.

With SurfDoubler running you can load any Internet application, such as a web browser on either PC, and a connection will be automatically established. From the main PC you can view Internet activity as a line graph and close or open a connection manually. Obviously, you won't want the link left open when it's idle, so you can set SurfDoubler to close it after a specific period of inactivity as well as limit the time the connection can remain open.

Farallon's network starter kit offers a simple solution for connecting a couple of PCs and sharing an Internet connection among them. However, upgrade potential is extremely limited and the router software only supports two PCs. At £99 ex VAT the kit is comparatively expensive as well, especially as you'll have to source a modem yourself.

SPECIFICATIONS

INTERNET CONNECTION SHARING

Yes

NETWORK CARDS

Number supplied: 2
Interface: PCI

NETWORK HUB

Model: Farallon Starlet/5
Number of ports: 5

NETWORK CABLES

Number supplied: 2
Type: Category 5

DETAILS

PRICE £116 (£99 ex VAT)

CONTACT Farallon 01494 562 734

www.farallon.com

PROS Simple setup; software router offers good control over Internet access

CONS 10Mbits/sec Ethernet hub and cards; average documentation

OVERALL A simple solution for a small network with shared Internet access, although only two PCs are supported by the software and the price is comparatively high

BUILD QUALITY ★★★

FEATURES ★★

VALUE FOR MONEY ★★

OVERALL RATING ★★

Putting Ethernet in the frame

Ethernet is a most remarkable thing. Since it was first mooted in 1973 by Robert Metcalfe, Ethernet has grown to become the dominant networking technology, now boasting an estimated 100 million interfaces installed worldwide.

Ethernet allows networked devices, such as PCs and printers, to communicate with each other over a shared medium or cable and is known as a connectionless service. When one PC sends a message to another device on the network, all other devices including the sender can hear it. However, only one transmission at a time is allowed on the network, so if two devices start talking at the same time it will cause a collision.

Clearly, a protocol, or set of rules, is required to stop this happening and a method called CSMA/CD (carrier sense multiple access/collision detection) was designed to do just that. It requires each device to listen first before transmitting and if no-one else is talking it can send its data. Unfortunately, this method actually causes collisions, as many devices may try and transmit at the same time when they think the line is free.

To stop collisions becoming permanent, a method clumsily called truncated binary exponential backoff is used. Each device that senses a

collision randomly generates a small integer and uses it to calculate the number of milliseconds (thousandths of a second) it should wait before retrying and will do this 16 times before giving up.

However, if a device gets access to the network and starts transmitting, then what's to stop it hogging the line? To stop this happening, Ethernet packets (or frames – they're the same thing) cannot be larger than 1,518bytes. Essentially, the rules for Ethernet are: listen first, if no-one else is talking then start talking but don't talk for too long.

So far so good, but how do stations know when a collision has occurred? Remember that when a device transmits a message everyone including the sender can hear it. If the sender transmits and hears nothing but static it knows the message never got through as the line wasn't free. If it hears the message it sent then it knows it must have been received.

So how do devices know when a message they've heard on the network is for their attention? Every network interface card (NIC) has an address placed in its memory chip at the factory and this is usually found on a small sticky label on the card. This MAC (media access control) address is made up of six bytes of data and is unique. The first

three bytes represent the address assigned to each card manufacturer and they can then choose the last three bytes.

Ethernet data frames follow a specific format and start with an 8-byte preamble field, which is nothing more than an electronic clearing of the throat to say that it is about to say something. Next comes the destination address followed by the source address, a couple of bytes to say what the message type is and then the data itself. A 4-byte frame check sequence completes the frame and is also used to verify that the data in the frame hasn't been corrupted during transmission.

This all sounds rather complicated, but the good thing about Ethernet is all the listening, collision detection and retransmissions are carried out automatically by the NIC and are completely transparent. The only time you're likely to become involved is if excessive collisions are causing network performance problems.

On very busy networks, as more data is transmitted, the likelihood of a collision occurring increases and eventually the network can reach a stage known as thrashing – there are so many colliding transmissions that no data is actually getting through to its destination. This state

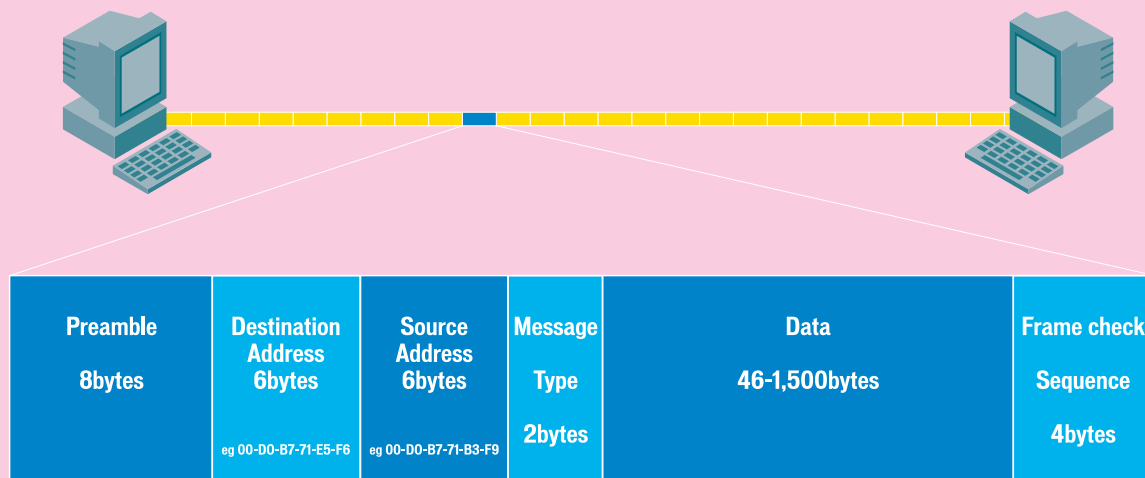
usually occurs at around 80 per cent utilisation of available bandwidth.

This problem can be alleviated depending on the type of hub you choose to install. A basic Ethernet hub is designed to receive transmissions, refresh them and send them to all its ports. Every device connected to the hub is on the same physical network and this is called a collision domain – every device can hear all the others and they are all affected equally by collisions.

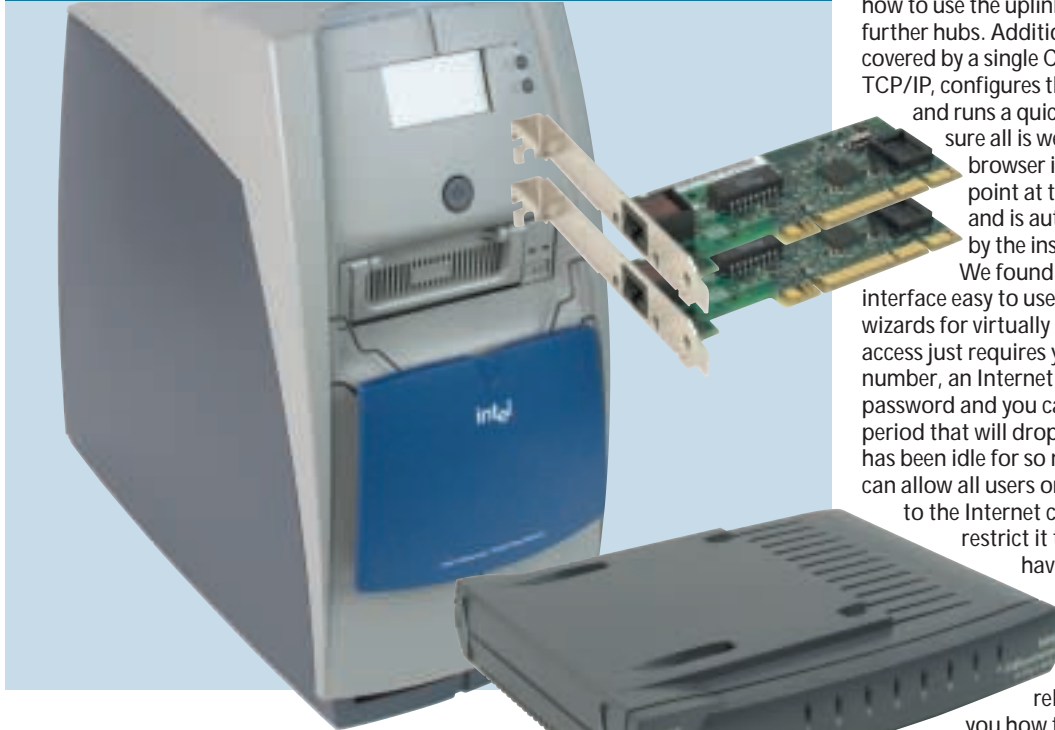
A switch, or switching hub, can reduce these problems by breaking the network into smaller collision domains. Physically, these look no different to a hub but contain powerful processors and memory that allow them to read and store the MAC addresses contained in each frame's header.

When a transmission occurs between two devices, the addresses are stored in a forwarding table held in memory, enabling the switch to 'remember' which physical port each device is connected to. Consequently, when further frames are received they are switched only to the port to which the destination device is connected, so in this way network traffic is reduced dramatically as transmissions are no longer being propagated across the entire network.

Basic Ethernet frame composition



Intel InBusiness Small Office



INTEL'S ASSAULT ON the small-business networking market began with the acquisition of Dayna Communications at the end of 1997 and resulted in the release of the InBusiness range. Primarily consisting of compact Ethernet hubs and switches, the emphasis is very much on low cost and ease of use.

The latest member of this family is the InBusiness Small Office Network that aims to provide everything a small business is likely to need, including file and printer sharing plus shared Internet access. It centres around Intel's

Small Business Network Appliance – a compact server that runs the new Windows for Express Networks, which has been designed by Microsoft specifically for controlling server appliances. Based on Windows NT4, it supports up to 25 users and comes pre-installed and ready for use.

Physically, the server appliance is well designed and built. The front panel flips up to protect the power button and above is a comprehensive backlit LCD panel that keeps you up to date with server operations. No monitor is required – in fact, no graphics capabilities are provided at all, as the server appliance is designed to be configured and managed using a

standard web browser from a logged-in workstation. It does have a parallel port, though, that can be connected to a local printer and shared among users.

At its heart is an Intel motherboard with a 440BX chipset, an Intel Celeron 466MHz processor and 64MB of memory on a single DIMM module. Storage is provided by a 13GB Quantum Ict10 EIDE hard disk and a backup function is also available with an optional 13GB Quantum hard disk mounted in a removable carrier at the front that can

be used to mirror the contents of the main drive. Four PCI slots are provided with one taken up by a 56K V.90 modem, but upgrading the system is not really an option as the casing is not easy to remove. Along with the server, Intel also provides a couple of dual-speed network cards and an eight-port InBusiness 10BaseT hub.

Installing the server appliance is simply a case of connecting the power, network and modem cables and switching it on. The LCD panel provides a running commentary of the proceedings and, after a few minutes, it's ready. Network card installation is helped along by a small pamphlet and the hub gets its own booklet, which

outlines a few network scenarios and how to use the uplink port for cascading further hubs. Additional options are covered by a single CD-ROM that installs TCP/IP, configures the protocol settings and runs a quick check to make sure all is well. The resident web browser is configured to point at the server appliance and is automatically loaded by the installation routine.

We found the browser interface easy to use as it provides wizards for virtually every task. Internet access just requires your ISP's phone number, an Internet username and password and you can select a timeout period that will drop the connection if it has been idle for so many minutes. You can allow all users on the network access to the Internet connection or restrict it to only those that have an account on the server. For email, the appliance can't act as a server, but the release notes show you how to set up a range of different email client products such as Outlook Express, Eudora and AOL.

Windows for Express Networks defaults to a fully open system, so you'll need tighter security. This only takes a few minutes and thereafter only those users with valid accounts can use the server's facilities. As each user is created they're also given a personal folder on the server. The advanced management features are extremely good as you can view the server's operating temperatures and voltages and ask to be advised if faults are detected. The server can also be accessed over a serial port or modem-to-modem link and an emergency console can be used to view and modify BIOS settings and installed hardware. There's even a facility for remotely managing the server over the Internet.

We were impressed with the number of features offered by the InBusiness solution. Everything a small business could need from a network is here and users with limited technical knowledge will find it simple to set up and run.

SPECIFICATIONS

INTERNET CONNECTION SHARING

Yes

NETWORK CARDS

Number supplied: 2
Interface: PCI

NETWORK HUB

Model: InBusiness 8-Port
Number of ports: 8

NETWORK CABLES

Number supplied: 1
Type: Category 5

DETAILS

PRICE £1,469 (£1,250 ex VAT)

CONTACT Intel
01793 431155

www.intel.com

PROS Easy setup and excellent management

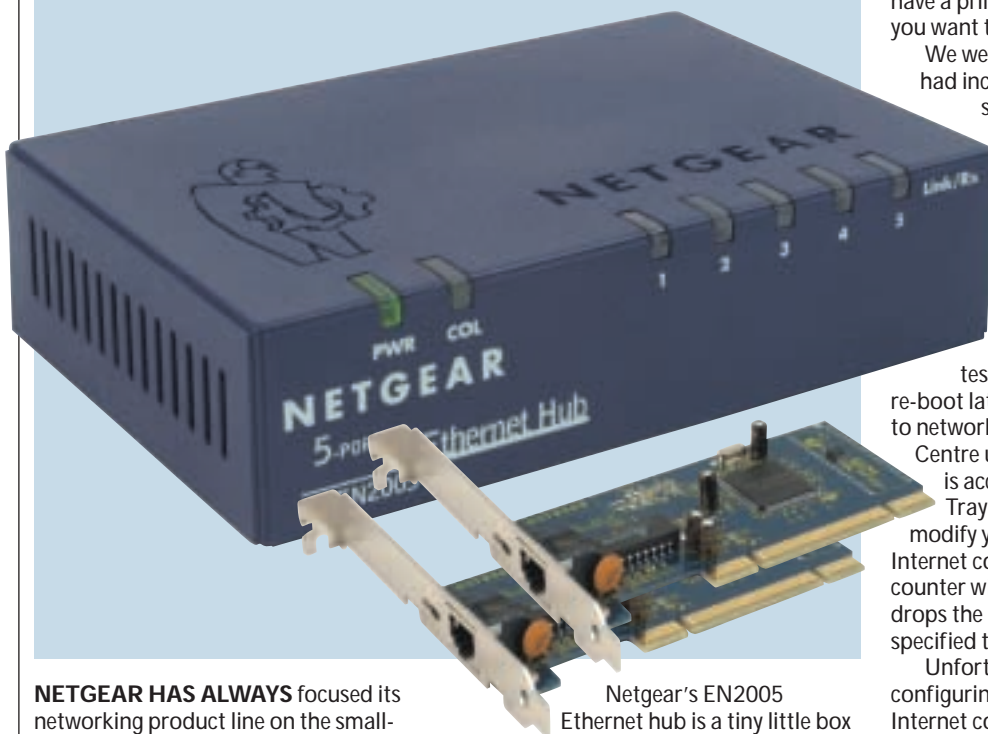
CONS Upgrade options limited

OVERALL A client/server solution that's well designed and simple to use and manage

BUILD QUALITY
FEATURES
VALUE FOR MONEY
OVERALL RATING



Netgear Network Starter Kit SB105



NETGEAR HAS ALWAYS focused its networking product line on the small-business and home-office users and offers a wide choice of budget-priced hubs, switches and network cards. Up until March this year, NetGear was part of Bay Networks, which then became Nortel Networks, so you may see some magazine advertisements still referring to these company names.

The original company began producing network starter kits back in 1997, with the early SB104 model offering a four-port 10BaseT hub, and was the first of its kind to bundle in a pair of dual-speed network cards allowing PCs to be upgraded easily to Fast Ethernet. The SB105 adheres to the same philosophy, as you get two dual-speed PCI network cards, a five-port 10BaseT hub and a simplified installation guide. A couple of 3m Category 5 network cables are also included. This cabling is the only type you should use when setting up a network as it is classed as data-grade cable. You may see older Category 3 cable available but should avoid it at all costs as it is only voice-grade quality. Should you decide to upgrade you will almost certainly experience problems as, although Category 3 cable can handle standard 10Mbits/sec throughput, it can't cope with the higher speeds of Fast Ethernet.

SPECIFICATIONS

INTERNET CONNECTION SHARING

Yes

NETWORK CARDS

Number supplied: 2
Interface: PCI

NETWORK HUB

Model: EN2005
Number of ports: 5

NETWORK CABLES

Number supplied: 2
Type: Category 5

Netgear's EN2005 Ethernet hub is a tiny little box about the same size as a portable cassette player. A row of status LEDs on the front show link status and activity for each port while a separate pair to the left reveal power status and detected collisions. At the rear you'll

find six RJ-45 sockets. Port 5 commands the last two of these – one can be used for a standard connection to a PC, or the uplink port alongside allows a second hub to be cascaded from it to increase the number of available ports. Unfortunately, the supplied documentation doesn't discuss this

option so you've no way of knowing whether you need a straight-through or cross-over cable to link the hubs together. Note also that, as the hub is only of the 10BaseT variety, it will have to be replaced with either a dual-speed or 100BaseTX version if you want to upgrade to Fast Ethernet.

The documentation guides you through the process of fitting the network cards and installing them under Windows. Next, you can use the accompanying FirstGear CD-ROM to help set up your network connection. It starts by asking for a unique computer name and a common workgroup name and explains the purpose of these requirements at each step along the way.

You can decide whether to share your hard disk and CD-ROM drive and, if you have a printer already installed, it asks if you want to share this resource as well.

We were impressed to see NetGear had included Internet connection sharing, as you can designate one PC as an Internet gateway, providing it has a suitable communications device. You can choose between ADSL or cable modems, ISDN terminal adaptors or a standard 56K modem. We chose the latter and FirstGear proceeded to test our dial-up connection. One re-boot later and our first PC was ready to network. FirstGear loads a Control Centre utility on the gateway PC that is accessible from the System Tray and from here you can modify your network settings and Internet connection. A useful idle time counter will reduce call charges as it drops the link if it hasn't been used for a specified time.

Unfortunately, when it came to configuring our other PCs to share the Internet connection, Netgear's documentation fell apart as there was no mention of how to do this. To get this to work we had to enter the host computer's local IP address as a gateway in the network TCP/IP settings on each client PC and add our ISP's DNS (domain name server) IP addresses as well. We were then able to share the connection over our local network but it's too much to expect novices to be able to do this themselves.

The Internet connection sharing capabilities could prove to be cost-effective as you'll only need to purchase a single modem and one Internet account for the whole office to use, although it was a shame that the documentation left us high and dry when it came to configuring client PCs. Problems aside though, the Netgear Network Starter Kit does offer good value for money, as you'd be hard pushed to source each component separately for less cash.

DETAILS

PRICE £67 (£57 ex VAT)

CONTACT Netgear

01344 397 021 www.netgear.com

PROS Good value and includes Internet connection sharing

CONS Hub only 10BaseT; Internet connection sharing poorly documented

OVERALL A good value network starter pack with Internet connection sharing for all users; pity about the documentation, though

BUILD QUALITY




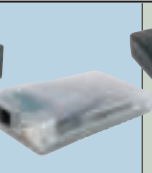
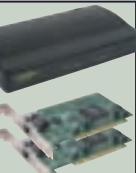


FEATURES

VALUE FOR MONEY

OVERALL RATING

★★★★
★★★★
★★★★
★★★★



Table of features								
MANUFACTURER	3COM	COMPAQ	D-LINK	D-LINK	FARALLON	INTEL	NETGEAR	
PRODUCT	AIRCONNECT WIRELESS LAN STARTER PACK	NEOSERVER 150 INTERNET PLUS	NETWORK KIT DFE-905	PHONELNE USB ADAPTER DHN-120	INTERNET SHARING STARTER KIT	INBUSINESS SMALL OFFICE NETWORK	NETWORK STARTER KIT SB105	
Telephone	0800 225 252	0845 270 4000	020 8235 5555	020 8235 5555	01494 562 734	01793 431 155	01344 397 021	
URL	www.3com.com	www.compaq.co.uk	www.dlink.co.uk	www.dlink.co.uk	www.farallon.com	www.intel.com	www.netgear.com	
Price (ex VAT)	£1,315 (£1,119)	£1,127 (£959)	£106 (£90)	£147 (£125)	£116 (£99)	£1,469 (£1,250)	£67 (£57)	
Server	✗	NeoServer 150	✗	✗	✗	InBusiness Server App	✗	
Operating system	✗	SCO Unix	✗	✗	✗	Windows for Express Networks	✗	
Processor	✗	Celeron 500MHz	✗	✗	✗	Celeron 466MHz	✗	
Modem	✗	✓	✗	✗	✗	✓	✗	
Internet connection sharing	✗	✓	✗	✗	✓	✓	✓	
NETWORK CARDS								
Number supplied	3	None	2	1	2	2	2	
Interface	Type II PC Card	N/A	PCI	USB	PCI	PCI	PCI	
Speeds supported (Mbps/sec)	1, 2, 5.5, 11	10/100	10/100	10	10	10/100	10/100	
Auto-negotiation	N/A	N/A	✗	N/A	✓	✓	✓	
NETWORK HUB								
Model	AirConnect Wireless Base Station	Compaq HB111	DFE-904	✗	Farallon Starlet/5	InBusiness 8-Port	EN2005	
Number of ports	N/A	8	4	✗	5	8	5	
Speeds supported (Mbps/sec)	10	10	10 or 100	✗	10	10	10	
MDI/X port	✗	✓	✓	✗	✓	✓	✓	
NETWORK CABLES								
Number supplied	None	2	2	2	2	1	2	
Type	N/A	Category 5	Category 5	USB cable/phone cable	Category 5	Category 5	Category 5	
Length	N/A	2.2 metres	6 metres	1.7 metres/4.5 metres	2.2 metres	2 metres	3 metres	

Buying with an eye for expansion

For most small businesses, a 10Mbps/sec standard Ethernet network will be all they ever need, as it is perfectly capable of handling the demands of simple file and print sharing. However, it would be wise to ensure that the network can be expanded easily if demand increases.

The majority of network starter kits come with a basic Ethernet hub with four or five ports and limited expansion capabilities, but it's likely this will be the first component to be dropped when you expand.

To increase the number of available ports you can connect more hubs together in a daisy chain. Also called

cascading, one port on each hub is used to connect the two devices together. A special cable with the send and receive wires crossed over may be required, but most hubs have a dual-function port often identified as an MDI/X port. It can function as a normal port or, with the flick of a switch, become a cross-over port allowing a standard straight-through cable to be used to link a second hub.

There is no limit on the number of hubs that can be in a cascade but, as signal quality and timing cannot be maintained beyond a certain point, no two end stations on an Ethernet network can be

separated by more than four hubs or five wiring segments.

If available bandwidth is being soaked up, the quickest option is to move up to Fast Ethernet as this offers an immediate tenfold increase in performance. Fast Ethernet is designed to look and feel like basic Ethernet, so there's very little required to upgrade.

When building your network it is advisable to fit dual-speed Ethernet cards in all your PCs, so they are ready and waiting.

To make life even easier, ensure all the cards support a feature called auto-negotiation. This means they will detect the maximum speed of the hub or switch they are connected to

and automatically configure themselves to operate at the highest available speed. Most will even do this on the fly, so each PC doesn't need rebooting. Cost considerations are low, as the price difference between standard and dual-speed cards is now so small it would be a false economy not to opt for the latter.

When you want to move to Fast Ethernet, all you need to do is replace the hub with a model that supports both speeds. However, it is not advisable to buy a hub that only supports Fast Ethernet, as this will mean that you won't be able to connect legacy devices.

Editor's Choice

Many small businesses are wary of networks as they assume that a high level of technical knowledge is required to set up and maintain them, even to the point of having specialist staff. While this is true of networks for large companies, it should not be the case for the small business or home office looking to join together a modest number of users.

Consequently, the most important consideration here is the ease with which it can be installed and configured. Clear documentation plays a big part in this, as many non-technical users will want to be guided through the process of installing the hardware, wiring it together and getting the PCs talking. As the previous pages show, too many manufacturers make assumptions – particularly when it comes to setting up network protocols. Clearly, some manuals could benefit from extra pages explaining what they are and how to load and configure them. Ethernet's limitations also need to be clearly described, as breaking these rules can easily make a network become unstable. Too many hubs between PCs can cause problems that are difficult to troubleshoot and it is possible to accidentally create a wiring loop that causes network traffic to circulate endlessly, soaking up all the bandwidth.

A problem we often see with many businesses is how quickly their network runs out of steam and needs upgrading. The type and variety of data crossing today's networks has changed dramatically over the past few years so it's important that the network can be

improved to keep up with demand. Although all the starter kits only provide at best a pair of network cards, the sensible choice is to opt for dual-speed adaptors. This is because when it comes to upgrading to Fast Ethernet, you won't have to touch your PCs again, they'll adapt to the new speed automatically.

Internet connection sharing is a valuable feature for any network, as it can offer big savings by allowing many users to share a single Internet account. Four of the network kits offer this as standard, although with varying degrees of success. Both Intel and Compaq provide connection sharing with simple management and control features. Netgear's solution is a lot simpler, but does allow an unlimited number of users to share a connection whereas Farallon's option is limited to only two PCs.

While an Ethernet hub is a crucial part of the networking equation, most of those supplied are only good enough to get you up and running. Four or five ports may be enough for a simple home office but once you start adding other users and devices, such as network printers, you'll need to add more ports. However, hub prices are so low it's a better bet to replace them with something larger when the time comes.

The winners

Considering we are looking at simple networking solutions for small businesses, our **Editor's Choice** goes to Intel's InBusiness Small Office Network as it provides everything you need for your first network. It was a close call

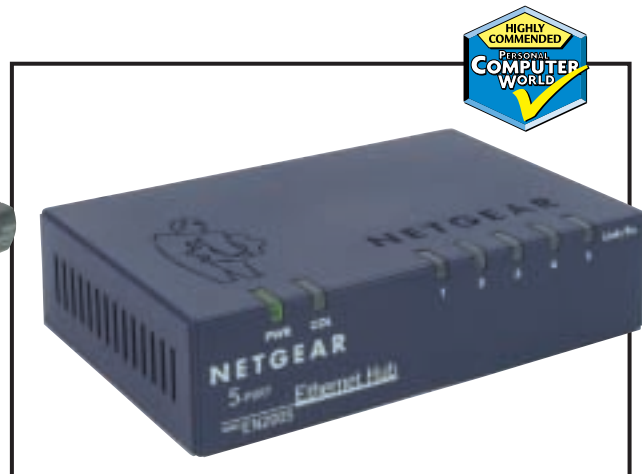
between Intel and Compaq as the products are closely related, but the InBusiness package was more complete. It's the more costly, but the installation was easy, as the CD-ROM-based utility took the hard work out of configuring each client PC. There's also little to separate the Intel and Compaq web-browser management interfaces, as they were both easy to understand and use and there was plenty of wizard-based help. Intel scored higher, though, as the kit came with a pair of dual-speed network cards to get two PCs up and running, plus a decent eight-port hub.

A printer can also be attached to the server appliance and shared among users. The management facilities were the best as you can set up good security and can also keep an eye on the server's vital signs from a networked workstation. The server can even be monitored and configured from a remote location.

Our **Highly Commended** award goes to Netgear for its SB-105 Network Starter Kit, as it offers very good value. For only £57, you get a pair of dual-speed PCI network cards, a basic five-port 10BaseT Ethernet hub and a couple of decent lengths of cable. However, the Internet connection sharing tools make it stand out from the crowd as it was a feature we hadn't expected to see at this low price. Although the documentation fell short of our expectations, the FirstGear software utility will prove to be a useful tool for small offices on a tight budget and could reduce Internet access costs substantially as everyone on the network can use the same ISP account.



Intel's InBusiness solution was the most complete package on offer



Netgear captured everything you need to network at a budget price

pcwexpert

Become an expert with our essential, in-depth guide to all things PC



258 HISTORY
260 TECHNOLOGY
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267 GLOSSARY
268 WORKSHOPS



PHOTOGRAPH PATRICK LLEWELYN-DAVIES

desktop publishing

Written by Ken McMahon

The days when hot metal typesetting was high-tech are gone, and today's DTP software makes it possible for anyone with a PC to enter the publishing world. This pcwexpert will take you through the technology involved, explain fonts and PostScript, and five workshops will guide you through some of the DTP basics.

A child of the Eighties

Since the introduction of the first Apple Mac and PageMaker, the publishing world has gone through revolutionary changes

The process of creating a published document has, in the past 20 years, undergone the same kind of seismic shift that occurred in the 15th Century when Gutenberg's movable type superseded hand-lettered manuscripts. It is justly called the desktop publishing (DTP) 'revolution'.

It's not so long ago that newspapers and books were printed using lead type arranged in a mirror image of the final product (see *pcwexpert* cover). Ink was applied to the letters, which were pressed against a piece of paper to create the printed version.

It was a laborious process and DTP is not just about the revolutionary hardware and software that made it possible to create professional documents electronically, it is also about the fact that it was designed to be affordable and accessible, enabling widespread adoption of the new systems and creating an enormous impact on the working life of thousands.

DTP prompted the amalgamation and contraction into one unified process of a number of previously separate specialisms, including typesetting, artwork production and graphic design.

From the 1960s onwards

phototypesetting became prevalent. Machines for this purpose replaced the metal type matrices used in their predecessors with photographic units. The CRT (cathode-ray tube) phototypesetters that in turn replaced them and were in use until the late 1980s, used digitally stored characters displayed on a CRT to image

onto photographic paper. One of the most popular models in use in the UK was Linotype's Linotron 505.

There was nothing wysiwyg about photosetting. Operators keyed in complicated commands that were embedded in the text. This was produced as 'galley' - long reels of photographic paper - with the type in place.

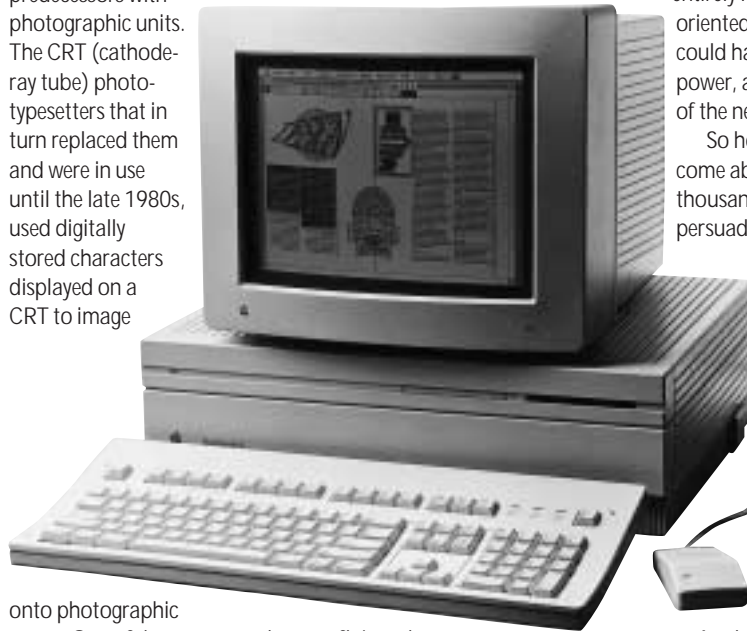
Graphic designers, on the other hand, often had no computer skills at all, and were hired for their individual design

flair and creativity, producing visual designs and mock-ups. A production artist provided the bridge between these two skills. They would follow the design rough, taking the galleys and cutting and pasting the words and pictures onto a layout grid. Desktop publishing, in the

best tradition of truly groundbreaking technology, was to smash through this demarcation and call for the creation of an entirely new breed of computer-oriented flexible designers that could harness the creative power, as well as the efficiency, of the new technology.

So how did this revolution come about? How was it that thousands of designers were persuaded to use a computer and do away with manual typesetting and artwork production? The three companies that provided the magic combinations of hardware and software that meshed to form the basis of DTP were Apple, Adobe and Aldus.

Apple is legendary for its Silicon Valley garage start-up story. The 21-year-old Steve Jobs teamed up with 26-year-old Stephen Wozniak in 1976 to build computers for the enthusiast market from the Jobs' family garage. The company quickly progressed, driven by the understanding of the need for



pcwexpert timeline

3100BC	197-196BC	1000	1450	1700-1800	1886
					
Earliest Sumerian Pictographic scripts written on clay tablets. A sharpened reed was used to record information in vertical columns.	Rosetta Stone (found in 1799) shows the same text in Egyptian hieroglyphics and demotic script, plus Greek. It helped in translation of Egyptian hieroglyphs.	Chinese calligraphy printed on paper with movable type. Calligraphy had developed from 1800BC into a sophisticated written language and art form.	Johann Gutenberg in Germany worked for many years to improve printing processes and in 1450-1455 produced a beautifully printed bible.	A century of innovation in typography by William Caslon and John Baskerville, followed by the Italian Giambattista Bodoni (above) and the French Didot family.	Ottmar Mergenthaler's Linotype machine introduces the mechanisation of typography with the Model 5 Linotype becoming widespread.

products that would sell beyond the hobbyist market, looked professional and were easy to use. Apple was so successful that by 1979 copier giant Xerox was interested in buying stock. As a result, Jobs and a handful of employees toured Xerox's Palo Alto Research Center (PARC), which had been founded in 1971 with the goal of developing the 'paperless office of the future'.

At PARC Jobs was shown a number of innovations (including networked computers and email) that now read like a roll call of building blocks for the personal computer industry. Jobs was shown a programming language called SmallTalk that pioneered the use of icons instead of typed commands for telling computers what to do, and the GUI (Graphical User Interface). This used bitmapping, which enabled the printer to output exactly what was shown on screen – What You see Is What You Get (wysiwyg).

Apple incorporated and built on these innovations with the Lisa and Macintosh computers released in January 1983 and January 1984. Jobs himself drove the design and implementation of the Macintosh project, insisting the computer should be not merely great but 'insanely great'.

These were computers aimed to appeal to people who were not computer enthusiasts and with the GUI of windows and icons combined with a mouse to make

them as easy to use as possible. The Macintosh in particular became an instant classic. The design shows a quest for elegant simplicity that permeates the way it looks and feels, from screen icons created by Susan Kare right down to the product packaging.

Despite its design innovations, the Mac was not a runaway success and had to be improved and revised, but it is a key component of the DTP revolution. What the Mac needed, and found in Aldus' PageMaker, was a 'killer application', a software program so compelling that it promoted hardware sales.

Paul Brainerd, a 36-year-old former newspaper editor, founded Aldus in 1984. His aim was to develop software to produce newspaper adverts more efficiently. Introduced in 1985, PageMaker was designed for the Macintosh. Brainerd coined the phrase 'desktop publishing'.

PageMaker gave designers a new flexibility; they could now combine type and images on screen, change type sizes and fonts, columns, headlines and borders at will, allowing designs and redesigns to be quickly and efficiently accomplished.

Traditional publishers and graphic designers were far from instantly won over by the new technology, though. The main stumbling block was the output resolution of laser printers, which were scorned for many years as

falling below professional standards. In 1985 Apple introduced the first Macintosh-compatible PostScript printer, the LaserWriter, which had a 300dpi (dots per inch) output of PostScript fonts. Subsequent developments in laser printer technology have seen output resolution rise to 1,200dpi.

The LaserWriter included PostScript renditions of several classic typefaces and a PostScript interpreter that gave near-typeset quality for typographical proofs and could be used for print jobs that did not require high-quality printing. While this may have been frowned upon by professional printers it was more than acceptable to many companies that needed to produce rapidly changing documents such as price lists or stock inventories.

PostScript, Adobe's page description language, forms the last pivotal innovation that fuelled DTP, alongside the Mac, the LaserWriter and PageMaker. Adobe was founded in 1984 by John Warnock and Charles Geschke, two computer scientists, both former PARC employees.







Apple had taken a 15 per cent stake in Adobe in 1983 and became the first licensee of PostScript, which was resolution- and device-independent. PostScript files printed on a 300dpi LaserWriter could be output at much higher resolutions on imagesetters.

Adobe acquired Aldus and PageMaker in 1994, withdrawing DTP's original killer app from the almost decade-long struggle for supremacy with Quark Xpress (that it had long lost) and repositioning it as an office product. Adobe has since rejoined the fray at the cutting edge of professional DTP with InDesign, a more credible contender for leadership of the DTP market.

In the past decade the impact of these developments has grown to encompass every aspect of the design and production of printed and electronic publications.

First, DTP made the cross-platform leap from MacOS to Windows and Unix machines. Nearly all the core professional DTP apps are now developed and released concurrently for both MacOS and Windows and offer near-identical interfaces and levels of functionality. The fact that the Mac is still regarded as the hardware platform of choice for creative professionals is more due to historical inertia, than any functional factor.

Adobe, Quark, Macromedia and Corel defined the shape of DTP in the last part of the 20th Century. As we move into the 21st they, like everyone else, are looking to new ways of defining the publishing process. In all likelihood, it will be as far removed from today's processes as PostScript is from Sumerian Pictographs (see timeline below).

	1960s	1970s	1984	1984	1985	1989
SCIENCE MUSEUM/SSPL						
	Phototypesetting using CRT-based machines and digital fonts becomes prevalent.	Xerox PARC engineer Gary Starkweather combines Xerox copier technology with a laser and high-speed mirror to produce the world's first laser printer.	Macintosh unveiled at Apple's annual shareholder's meeting. Building on the Lisa computer and PARC technologies the Mac becomes a design icon.	Paul Brainerd founds Aldus and, a year later, releases PageMaker. Brainerd wanted to charge \$500,000 for it, Steve Jobs persuaded him to sell for \$495.	Apple announces the LaserWriter, featuring a Canon 300dpi print engine and Adobe's PostScript page description language. (Windows 1.0 released).	A succession of software releases, predominantly Photoshop, Illustrator and Quark Xpress sees DTP surpass the capabilities of conventional repro.

Achieving that professional look

DTP software enables anyone with a computer to produce great looking documents, but getting it right can still be complex

The vision behind the DTP dream was to make it possible for anyone with a PC to produce professional looking documents. These days you can do that with Microsoft Word, so is that a DTP program, or just a sophisticated word processor?

In the broadest sense, anyone who spends a little time and thought to make sure their printed communications have more impact, and are interesting and readable by using a wysiwyg layout application to arrange type and pictures on screen is involved in DTP. Whether it's a memo for office distribution or a national newspaper, the process is fundamentally the same.

Over the past decade DTP software tools have grown enormously in sophistication and power, making the creation of all kinds of publications much quicker and simpler. Another consequence of improved software has been better looking documents. From art books to junk mail, DTP software has allowed designers to explore their creativity to the full, unhindered by technical or cost constraints.

Using even modest software on a home PC it's possible for those of us without professional design skills to achieve a similar transformation in our publications, whether it be a local sports club newsletter, school governors' report or stationery for a small business.

From the top

The production process for DTP is essentially the same whatever the nature of your document. Copy must be written, usually in a word processor and saved as a text file for import into the DTP application. Pictures must likewise be sourced, edited and saved in an appropriate file format for import.

So the first uncomfortable truth about DTP begins to dawn – it takes more than one application. To get by you'll need

a simple text editor, an image-editing application and a drawing program for creating and editing vector images. DTP applications aimed at the home user, like Microsoft Publisher 2000, and Serif PagePlus 6, integrate these functions. Applications targeted at professionals are usually grouped into publishing suites offering a high degree of integration between the constituent programs.

Why do you need two programs for photographs and illustrations? Well, the two are handled differently by your PC. Photographs, whether you take them with a digital camera, scan them on a flatbed scanner, or buy them from an online photo library, will need to be resized, cropped, possibly rotated and saved in the right format before you put them on the page.

You can do most, if not all of

these things from within your DTP application, it's true, but it's best to get the image editing done at this stage for a number of reasons. Whether your DTP application embeds the image file or links to it, any changes you make within the DTP application will have to be applied to the image every time you print it.

Take cropping. It may be that you only need a small section of a photo, cropping in tightly on the

Preflighting

You wouldn't expect your plane to leave the ground without the pilot at least having checked the oil and water, then sending your publication off to the printer without rigorous checking is likely to cause you equal, if not greater distress.

A lot can go wrong when you send a document to a pre-press bureau for colour-separated film output, but 'preflight' applications can analyse and highlight problems before they cost you money. To see software preflighting in action, download a demo of Markzware's FlightCheck from www.markzware.com. It works with Xpress, PageMaker, Illustrator, Freehand and CorelDraw (see workshop later).

The first, most often overlooked step is to proofread your document. If yours is the only pair of eyes to have viewed it, get someone else to take a look. As well as literal errors - spelling mistakes, missing punctuation etc - check that it makes sense, there are no widows, orphans (see glossary), bad line breaks, missing captions or misaligned columns. Make sure type is set in the correct style, although if you've used style sheets this shouldn't be a problem.

By now, there should be nothing obvious wrong with your document, just plenty of invisible horrors waiting to destroy your credibility. Colour is the cause of many of these. First make sure all your pictures are in CMYK format (cyan, magenta, yellow and black) and at least 300dpi (assuming you are printing with a 150-line halftone screen), at their output size.

A common error is to enlarge a small picture to a point where its output resolution becomes so low you can see the pixels when it is printed.



Other colour problems stem from incorrect specification and naming of spot and CMYK colours resulting in too many separations. The easy way to check for this is to print the separations to a mono laser printer, though some apps have screen preview.

If you are printing in CMYK you should have only four separations, or plates. Any more than that and the likely explanation is that one of your colours has been defined as a spot colour.

While you are doing this, check the pictures are separating to all four plates - if everything appears on the black, then they are in RGB (red, green and blue) and not CMYK format.

As a final precaution, send just one page to the bureau for films and a proof. If there's a problem with a repeating element you can sort it out before running the rest of the job.

subject. If you do this in an image editor and save the file, the new, cropped file will be considerably smaller than the old one. It will use less disk and memory space, import into your DTP application more quickly and print in a fraction of the time it would have taken had you imported the entire file and cropped in the DTP application. If you're worried about doing something irreversible to your pictures make backup copies.

You also need to make sure your pictures have sufficient resolution and are in the correct format if you intend to have your document commercially printed. Photos intended for commercial colour printing need to have twice the pixel resolution of the halftone line screen being used. For more on this see the explanation in September's *pcwexpert* covering scanners. You also need to ensure that images are in CMYK format as any RGB images will not separate properly.

The digital photographs that image editors deal with are made up using thousands of coloured dots, or pixels. Draw programs do it differently. They don't do photographs, but illustrations – non-photographic drawings, charts, diagrams, signs, logos and so on.

Draw programs don't use pixels; vectors describe picture elements and as such produce small file sizes that can be enlarged without loss of quality and work well in PostScript environments. While resolution isn't a concern with vector art, you do need to ensure that the colours you use are suitable for your chosen printing method.

Laying out the page

Before you launch your DTP application you should have all your content – copy and pictures – ready for layout on the page. It's a good idea to have at least a rough idea in your head of how your publication is going to look before you start. DTP applications make it easy for you to rearrange elements on the page and even change the look of an entire publication at a stroke, but unless you've a reasonably

good idea of what you are aiming for you can go round in circles.

Once you do know where you're headed, DTP software has a number of excellent features to help you get there with the minimum of pain and effort. One of the most useful is master pages. These save you the bother of having to put repeating elements like company logos, page folios and background images on every single page. They are also used for setting up column guides and page margins. Not all master pages are equal, however. Some applications let you set different left and right master pages, unequal columns on the same page, automatic page and section numbering and have a high degree of control over what happens to your document contents if master page items are edited or deleted.

In consumer applications, master pages tend to be combined with templates to provide a head start for those who need help with page layout. Column grids are set up, dummy headline and body copy is positioned and a colour scheme and style sheets are configured.

Next to master pages, style sheets are probably the designers' biggest friend, relieving you of hours of tedious text editing. Typically in a small publication design you'll use a number of fonts, perhaps from two type families. Running heads (a short paragraph appearing before a headline), headlines, crossheads, captions, pull quotes ('sound bites' pulled out of the body copy and set in large type for emphasis), box copy and body copy all require different type settings for font, alignment, leading, space before and space after. With each appearing many times on each page, in a long document this could add up to thousands of occurrences.

Style sheets let you apply all the settings for a type style at the press of a key. Until recently, paragraph style sheets were the norm, but applications like Quark, Corel Ventura and Adobe InDesign have introduced character style sheets that can be applied to individual words and letters.

Overprinting

On colour-separated film a series of colour bars and target marks outside the trim marks ensure the plates are printed in register – exactly on top of one another – on the press. Mechanical limitations of the press and paper shrinkage and expansion make this impossible to achieve with 100 per cent accuracy and some misalignment is inevitable.

Where elements overprint one another, for example black text on a solid coloured background, this isn't a huge problem. But overprinting is often not an option due to the effect of printing one colour on top of another – if you print yellow on top of cyan you get green. To avoid this the topmost element 'knocks out' the underlying colour leaving a white hole into which it sits – provided everything is in register. When misregistration occurs, part of the topmost element overprints the underlying colour and a white gap shows where it has 'missed' the hole.

To avoid this, trapping slightly enlarges the topmost element, or shrinks the hole, so there is a slight degree of overlap. The former is called spread, the latter choke. At the overlap is a mix of the two colours, but it is so small it is barely noticeable.

Some DTP applications trap automatically, but you may want to talk to your printer to ensure that the auto settings are suitable for the press. Manual trapping can be quite tiresome to set up, but you only need to do it once.



Spread: Lighter foreground extends over dark colour



Choke: Light background extends over dark object

A useful feature of advanced style sheets is the 'next style' setting that allows you to define the style for the paragraph immediately following. It might be the case, for example, that 'body copy' always follows

'intro', or 'price' follows 'product'. Quark Xpress takes this one step further, allowing copy editors to insert style sheet tags that are applied to the document at import. For newspapers and magazines that

employ the same layout style issue after issue this can be a huge timesaver.

Tags are embedded within the copy using <angled brackets> and an import filter translates them and applies the appropriate style sheet. Using carefully tagged copy and a well-designed template it's possible to automatically format pages so they need very little manual work once the copy has been imported.

Usually, though, even with master pages and style sheets, with copy in place on the page there is still a lot to be done. Fortunately, even the most modest DTP packages provide exacting typographic control and there's no excuse for even the lowliest publication to suffer the indignities of widows, orphans, bad breaks, bad hyphenation or, heaven forbid, rivers.

Some applications provide no end of text effects with which you can enliven your pages. You can condense and expand type, fill it with a pattern, add drop shadows and even make it glow. While these may be OK with large display type, they're best left alone when it comes to anything smaller as they will make it less readable, the opposite of what you're aiming for.

Typographic controls that will make your copy easier to read include leading, kerning, tracking and, used with care, hyphenation. Kerning and tracking are sometimes used to describe the same thing. In fact kerning is the process of changing (usually reducing) the space between a pair of letters (see picture right). Most fonts are proportionally spaced (an I takes up less space than a W), and include kerning tables, but often kerning between certain letter pairs, like AW, can do with some improvement.

Tracking applies to the space between all the letters in a word, paragraph, or document. The tracking affects the overall look of a page of type – something designers refer to as 'colour', though it has little to do with the word in its usual context. Tighter tracking makes the type look heavier. You can adjust the tracking in or out by a small

Adobe Acrobat

So, you've sweated hard and your publication is at last finished. But you want to put a copy on your website, or your partner wants you to email it to them before it goes to press. What do you do?

You make a pdf file with Adobe's Acrobat portable document software. Acrobat is the standard for electronic documents on the web and elsewhere. If you've downloaded software, chances are you got a pdf manual with it.

Design studios are increasingly using Acrobat to 'soft proof' designs to clients before spending money on inkjet proofs, and companies are creating pdfs to email to colleagues, rather than printing in-house reports and memos for distribution.

The beauty of Acrobat is that you can create documents on any platform and in any application you like using any fonts, and all you need to view pdf files is the Acrobat reader that is available free from the Adobe website at www.adobe.com.

Acrobat takes the PostScript file generated by your DTP software and distills it into pdf format, downsampling graphics and compressing them. You can embed all the fonts, a subset comprising only those characters in the document, or leave it up to Adobe's multiple

master font technology to produce a facsimile of the fonts used.

With the last option the fonts won't look the same (script fonts seem to fare particularly badly), but all the line breaks and formatting will be preserved exactly as in the original.

Acrobat's sophisticated hypertext features allow you to link to other parts of a pdf document or to an external URL. It also has powerful search features. Acrobat Catalogue indexes collections of pdfs in the same way that search engines trawl the web, so you can quickly find any occurrence of a word and provide options such as Boolean operators, word stemming and 'sounds like'.

Version 4 of Acrobat provides much greater scope for editing pdf files. You can make minor corrections to type and graphics using touch-up tools, add digital signatures and make text, audio and rubber stamp annotations.

Adobe is positioning Acrobat as a pre-press wrapper for delivery of DTP output files to PostScript bureaux. PostScript 3's ability to directly process pdf files combined with RIP (raster image processor) colour separation and trapping will make pdf the obvious output route, particularly given the trend for applications to support direct pdf output.



margin to make a story fit the available space, but always be aware of the effect it has on readability.

Whether your type is justified, aligned left, or right, the DTP application's compositing engine determines where line breaks occur. Within limits, the compositing engine can alter the letter and word space in order to get lines to fit. With justified type (aligned both sides) this job becomes more difficult, particularly when columns are narrow and words are long.

One way to improve line breaks is to hyphenate text. Most applications can do this automatically, but some are better at it than others. Programs like PageMaker and Xpress use a rules-based algorithm supplemented by a hyphenation dictionary to which the user can add definitions, but the results can often be unexpected.

Adobe InDesign has an advanced compositing engine based on the work of Donald Knuth, a computer scientist and Stanford University professor emeritus, who developed the public domain typesetting application Tex. Adobe's multiline composer analyses several lines of type in both directions to determine the best place for line breaks. This approach results in more even spacing and fewer hyphens.

The final stage in the production cycle of a DTP

document is preflighting and collecting for output to be sent to the digital print or PostScript film bureau. Most DTP applications link, rather than embed image files. A low-resolution placeholder is used for screen display, but a pointer to the original high-resolution file ensures it is used for printing.

If your application doesn't support automatic collection of these files you will have to do it manually. If they are missing, the 72dpi placeholder will print instead. Preflight programs (see boxout on page 260), as well as checking for technical problems, usually collect all graphics and font files into a single compressed file for delivery to the bureau.

Having taken advantage of every labour-saving, creativity promoting, deadline-busting feature the DTP package has to offer, you can sit back and relax – until the proofs come back.

The art of speaking in tongues

One of the programs that makes DTP work so well is PostScript, which tells your printer how to print what's on the page

PostScript is a page description language that tells your printer what's on the page and how to print it. It was invented by Adobe in 1985 and without it DTP would not exist.

In the dark ages, printers used a daisywheel or golfball device with the characters arranged on it. ASCII code for the required character was sent to the printer which turned the wheel or ball and struck it against the paper with an ink-coated ribbon in between.

A few extra Ctrl codes were required for things like carriage returns, bold and italic type and double-spaced lines, but that was about as complicated as it got. Later, dot-matrix printers worked in a similar fashion, with greater speed but almost as much noise.

Laser printers offered the potential for more sophisticated type and graphic printing, not to mention quieter operation. The first PostScript RIP was built into the Apple LaserWriter in 1985. PostScript made the most of the technology by providing a versatile method for producing type and graphics on any printer, regardless of its resolution.

One of PostScript's most powerful features is device- and resolution-independence. If you print a PostScript file to a 300dpi laser printer you get the best output it can muster. Output that file to a 2,400dpi imagesetter and you get 2,400dpi output suitable for commercial printing.

PostScript describes page elements in vector format. The following PostScript example prints a 1in black square in the bottom left corner of the page:

```
0 0 moveto
72 0 Lineto
72 72 Lineto
0 72 Lineto
closepath fill
showpage
```

Objects are described algorithmically in terms of shape, dimension, colour and position on the page. Only at the moment of output is the page rendered

into dots and their frequency is determined by the printer.

The job of converting the PostScript file into a bitmap is carried out by the PostScript interpreter, or raster image processor (RIP). All PostScript printers contain an interpreter. In output bureaux the job of interpreting PostScript files is done by a separate hardware RIP that also handles fonts and queues jobs.

PostScript has evolved to meet the requirements of the commercial printing industry and the increasing sophistication of graphics software. The first incarnation, PostScript Level 1, had no support for colour – introduced with Level 2 in 1991.

Other features introduced with Level 2 included a CMYK colour model – making colour-separated output possible – optimised graphics operators, colour management features and cached multiple printing elements – resulting in faster performance – and better halftoning. Support for composite fonts and vertical font metrics extended Level 1's limit of 256 characters and paved the way for fonts in languages like Kanji with more than 7,000 characters.

In 1997 PostScript 3 added graphics capabilities aimed at design and print professionals, while also attempting to move further into the corporate market.

Graphics enhancements include better blends, extra greys, finer colour controls and better performance by up to a factor of six for complex graphics pages.

PostScript 3 furthers Adobe's aim of implementing a fully digital pre-press workflow, naturally using Adobe products from beginning to end. Composite files contain all the colour information for a page rather than separating it into C,M,Y and K components. This means separation and trapping can be carried out at the pre-press stage. It also means you can use one file for several output destinations. PostScript 3 can also directly print pdf files.

Software PostScript

Most PCs use the Windows GUI to provide font and graphics information to your printer. But there's a less expensive way to get the advantages of PostScript without forking out for an expensive colour PostScript printer. There are several software PostScript RIPs on the market – two of the simplest to use are Epson's Stylus RIP and Adobe PressReady.

A software RIP uses your PC's CPU to do the work rather than dedicated hardware within the printer. This may take longer, but any Pentium-class machine will easily be up to the task.

As well as being a much cheaper option than hardware, software PostScript can be easily and inexpensively updated, providing the benefits of performance enhancements and new features.

Stylus RIP works with Epson's A4 and A3 colour inkjets and PressReady is compatible with colour inkjets from various manufacturers including Epson, Canon and HP. It uses Adobe's pdf format to prepare files for printing using the PostScript 3 software RIP. Find out which printers PressReady supports at: www.adobe.com/products/pressready/printers.html.

Stylus RIP also acts as a print server, enabling you to provide networked colour PostScript printing on a printer with only a parallel port connection.

By combining an inexpensive A3 colour inkjet printer with a software PostScript RIP and installing a colour management system, you can produce digital colour proofs comparable to those produced on professional systems costing many thousands of pounds.

But for the best value PostScript of all go to www.cs.wisc.edu/~ghost for Aladdin Ghostscript 6.0.1. This independently developed, free PostScript interpreter, effectively turns your ordinary Windows printer into a PostScript device and creates pdfs (see picture).



Font of all knowledge

Rendering typefaces on the screen and on paper requires different technologies in order to achieve a wysiwyg result

Though people tend to use the terms font and typeface interchangeably they actually refer to different, though related things. A font is one instance of a typeface in a specific size. Times italic 10pt is a font. All instances of Times italic in all sizes make up the typeface and all the Times typefaces – italic, bold, bold italic – make up the Times typeface family. What makes a typeface identifiable and original is the common design characteristics shared by all of its characters.

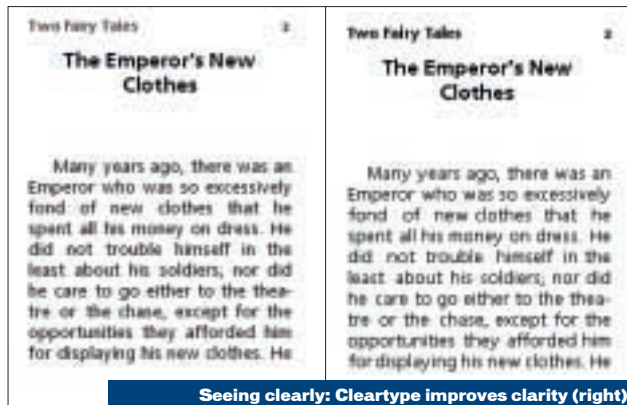
Broadly speaking, typefaces are categorised into two groups. Serif fonts are based on calligraphic lettering and short counterstrokes at the end of the main strokes. Examples of serif fonts are Times, Garamond and Palatino. Sans serif typefaces (such as the one used here) are cleaner and don't have these adornments. Helvetica, Arial and Gill Sans are all sans serif. In addition to these two main categories you might also see type classified as Oldstyle, modern, slab serif and script.

PostScript fonts

The Apple LaserWriter was the first printer capable of printing the digital fonts with which we are all now familiar. It contained 13 PostScript typefaces licensed from Adobe, including Times, Helvetica, Century Schoolbook, Palatino and Bookman.

On the Mac, PostScript fonts consist of a screen font and a printer (or outline) font. The printer font consists of a PostScript outline of every character and because they are PostScript they can be reproduced at any size with no loss in quality.

Screen fonts, on the other hand, are bitmaps. Because of the undesirable consequences of scaling bitmap fonts, screen fonts were often supplied in several sizes, so avoiding the massive pixellation that resulted if you attempted to scale a 10pt font to 48pt; intermediate sizes were



Seeing clearly: ClearType improves clarity (right)

reproduced by scaling the lower sized bitmap by a small factor.

Having one (bitmap) system to display fonts on screen and another (vector) to print them was less than satisfactory. DTP was supposed to be the ultimate in wysiwyg, but what you saw on screen bore little resemblance to what was printed.

Adobe's solution was Display PostScript, but neither Apple nor Microsoft was overjoyed at the prospect of having a core feature of their OS controlled by a third party. So they collaborated on the development of the TrueType font format.

Adobe's response was to publish the specification for its PostScript Type 1 font format, resulting in a flood of typefaces from companies like Bitstream, and to announce the release of Adobe Type Manager (ATM), a utility that provided smooth, scalable fonts both for screen display and output to non-PostScript printers.

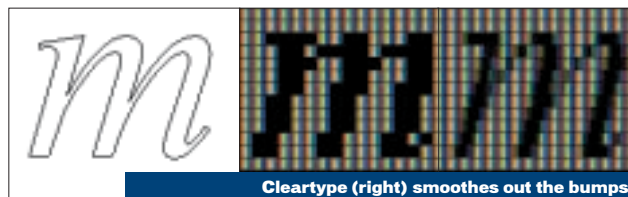
Apple released TrueType for the Mac early in 1991, followed by Microsoft's Windows 3.1 implementation. Since then little has changed, but there have been attempts to introduce new font technologies, such as Apple's TrueType GX, which failed to attract an audience because of its lack of cross-platform capabilities, and the Microsoft-Adobe collaboration on OpenType.

OpenType is basically a

wrapper that can encompass TrueType, Type 1, or both font formats so that you, or more to the point your OS won't need to worry about font formats.

There are two type standards in circulation – Type 1 and TrueType. The latter is supported within the OS by Macs and Windows, the former requires ATM.

Type 1 fonts have widespread support within the print publishing industry. Commercial font foundries like Adobe, Linotype, and Agfa Monotype offer their font libraries in Type 1 format, whereas only one foundry, Bitstream, offers both Type 1 and TrueType. Another advantage of using Type 1 is that you will have



ClearType (right) smoothes out the bumps

few problems outputting pages at a pre-press bureau.

Type 1 PostScript fonts use a technique called hinting that improves the quality of printed characters at small type sizes. You might think a character's shape would be the same regardless of its size, but this has never been the case. At smaller sizes and lower resolutions, on screen for example, a character's thicker

strokes can fill in and thin strokes can disappear. Hinting subtly changes the weight and shape of a character's stroke to make it more readable at smaller sizes.

In favour of TrueType is the fact that you don't need a copy of ATM to display and print perfect fonts. TrueType's superior hinting means it displays much better on screen and on low-resolution printers than Type 1 fonts.

Windows includes several TrueType faces and most DTP and graphics apps bundle hundreds more. However, many of these fonts are poor quality, having been automatically converted from bitmapped originals or other poor quality sources, and no amount of hinting will make them look as good as a professionally produced font.

Recent font developments have focused on improving on-screen legibility in web browsers and on LCD displays. Microsoft's ClearType, which works with TrueType and 'TrueType flavoured' OpenType fonts, is available only with the Microsoft Reader application that ships with the Pocket PC, but Microsoft plans to make it part of Windows.

Adobe's CoolType, due late next year, will work with all three

formats – TrueType, OpenType and Type 1 – and will be cross-platform. Adobe plans to merge CoolType into its Graphics Module (AGM), the rendering model used for InDesign, Illustrator and Acrobat. Acrobat, which will compete head to head with the Microsoft Reader on ebook hardware, will be the first beneficiary, when it gets its next major upgrade in 2001.

A new era of printing on demand

The Internet is a major force in electronic publishing and distribution, but does that mean paper's days are numbered?

DTP promised to democratise publishing. Anyone with a PC, laser printer and inexpensive software would be able to print and publish.

It's the publish part that DTP has failed to deliver. While you can design and print as many copies of your novel as you like, putting it on the streets is as much of a problem as ever.

The Internet has provided the answer to the problem of distribution in spectacular fashion. As the web becomes an increasingly important distribution medium, DTP applications are developing features that enable them to output not just to paper, but in electronic formats such as HTML, XML and pdf.

Most DTP applications for the home and small office include export options for these formats and Quark's Avenue Quark allows Xpress users to automatically tag the content of Xpress pages.

By adopting pdf as the native file format for InDesign and Illustrator and making it an integral part of the pre-press workflow, Adobe is ensuring its DTP business is geared towards electronic as well as paper media.

Though edocuments are the future, we still love to pass around little pieces of paper, so printing will be with us for a while.

Printing technologies are advancing on two fronts: 'computer to plate' (CTP), which eliminates the intermediate film

stage of the pre-press process, and digital printing.

Conventionally, pages are output to film on a high-resolution imagesetter and these are then contact printed to the plate by exposure to ultra-violet light in a vacuum frame. CTP platesetters use a laser to write the image data straight onto a litho plate that can be used on a conventional press. The latest platesetters use a thermal imaging process that eliminates the need for chemical processing.

Digital printing is revolutionising the way we think about print. It offers quick turnaround and flexibility, making it possible to print short-run colour publications cost effectively, print documents only when required and customise copies.

A number of technologies are involved. Heidelberg's Quickmaster DI is a digital litho press that incorporates CTP. It uses a laser to etch silicon-coated plates to expose an ink-attracting layer beneath. Material for 35 plates is stored in the unit. But once the plate is etched, changes can't be made and only one side of the paper can be printed at a time.

Dry toner electrophotographic presses use a process similar to laser printing. An LED array exposes a photoconductor drum that picks up toner and transfers it to paper. Heating units fuse the toner and bond it to the paper. Manufacturers include Xeikon, Agfa and Creo-Scitex.

Israeli company Indigo uses a similar process, but replaces the toner with ink. As on a traditional offset press, the image is transferred to a blanket before being applied to the paper.

Xerox has defined what it calls 'the new business of printing', highlighting four areas it sees as the future of printing – just in time, one-to-one marketing, digital book production and Internet document delivery with global distribution.

'Just in time', a phrase



borrowed from the manufacturing industry, means producing goods only when they are ordered and holding minimal or zero stock. 'Print on demand' has emerged because of the ability to cost-effectively print and bind short runs or one-off copies of a document. Course materials for distance learning, for example, can be printed and sent out as students request them.

Another variation of print on demand is digital book production. Books don't sit on shelves gathering dust, but are stored in an online archive and printed on a one-off basis when requested. Xerox has an on-demand book printing factory using its DocuTech sheet-fed printing system at Libri in Germany.

While print on demand currently focuses on mono texts, advances in digital colour printing will make it a reality for high-quality colour books and magazines in the future.

Xerox's notion of one-to-one marketing derives from the customisation possibilities offered by digital printing. Because you can change any element of the page each time it is printed, the opportunity to customise a document for individual recipients using database records is a powerful tool for marketers.

Your local supermarket can send you special offer flyers based on the products that you

buy each week; financial services companies can provide information based on known customer interest. All of these will be in a format indistinguishable from that currently produced on conventional offset litho presses that demand print runs of several thousand to be cost effective and offer no customisation options.

Distributed printing is also set to grow over the next decade. Centrally produced documents will be made available on the Internet for download and printing at local centres.

Nobody, it seems, is yet fully decided whether the future of publishing lies in paper-based or electronic products and the signposts change almost daily. The success of Stephen King's ebook *Riding the Bullet* has generated huge interest in the electronic book format developed by Microsoft.

Ebook software runs on the Pocket PC platform as well as Windows laptops and features fonts specially designed for readability on LCD screens using Microsoft's ClearType technology. ClearType, and Adobe's CoolType, use sophisticated sub-pixel level anti-aliasing to produce a more readable display.

Perhaps the future of DTP lies in an unlikely combination of old and new technology. Electronic ink, developed at the MIT Media Lab (see *pcwexpert* on monitors in October's issue) looks and prints like ordinary ink, but behaves like a dynamic electronic display. Thousands of tiny microcapsules suspended in the ink change colour when voltage is applied.

Electronic ink could be printed onto practically any surface. One proposed application is a book that looks like an ordinary book with paper pages, but each page is a digital screen displaying whatever content you want – when you've finished reading *Pride and Prejudice* it turns into *Sense and Sensibility*. Now that's what you call a real ebook.

Edocuments are the future, but we still love to pass around little pieces of paper

DTP terminology

The pcw expert Glossary explains acronyms and specialist words you need to know if you're doing desktop publishing

Ascender The part of a lower-case character that extends above the body.

Baseline An imaginary line on which the base of most characters rest. Baseline shifting moves characters up or down from their usual resting place on the baseline.

Bezier curve A curved line between two control points that can be manipulated to change its shape. Based on formulae defined by Pierre Bezier. Bezier curves were first used in car body design.

CMYK The four subtractive primary colours – cyan, magenta, yellow and black (the K stands for 'key plate') used in process printing. All other colours are made from a combination of these four.

Descender The part of a lower-case letter that extends below the baseline.

Drop cap Oversized character at the beginning of a paragraph that descends over several lines. An oversized initial capital that sits on the baseline and extends upwards is a raised cap.

Em Typographical measurement – the width of the M character (which is square) in a font, so a 9pt em is nine points wide. A 12pt em is called a pica em. Half an em is an en.

Font Complete set of characters of the same design, style, weight and size, eg 10pt Arial bold italic.

Glyph Any character of a font – a letter, number or punctuation, or a graphic ornament.

Traditionally known as printer's ornaments, or arabesques, such fonts are now called dingbats.

GCR Grey Component Replacement, a pre-press process for using black ink to replace equal combinations of cyan, magenta and yellow in scanned images.

Greeking Fake text, or grey rules and boxes substituted for text and pictures in a layout visual, or on screen to speed display redraw.

Gutter The margin in the centre of a double-page spread.

Imposition The arrangement of pages on a large sheet so, when printed, folded and trimmed they appear in the correct order.

Kerning Adjusting space between letter pairs to improve their appearance.

Leading (pronounced 'ledding') Line space, usually specified in absolute point sizes eg 8/10pt Arial (said as eight on 10 point) is 8pt type with two points leading (called leading after the pieces of lead that were used to separate lines of letters).

Ligature Special character pairs joined to make a single glyph eg fi, fl, ff.



Offset litho(graphy) Most commonly used commercial printing process based on the fact that oil-based ink and water do not mix. Offset presses can be either sheet-fed, or for longer runs use a continuous roll of paper called a web. Invented by Aloys Senefelder in 1798.

Orphan The first line of a paragraph that falls at the bottom of a column, generally to be avoided.

Pantone Proprietary colour matching system where standard colour swatches are identified by numbers. Other systems include Toyo and Trumatch.

PDF (Portable Document Format) Adobe's cross-platform

system for portable electronic documents.

Pica Typographic measure equal to 12 points, or one-sixth of an inch.

Point Typographic measure equal to 1/72 of an inch.

PostScript Adobe's industry-standard page description language (PDL).

Raster image An image defined by a grid of pixels each with a value specifying its greyscale or colour value. A colour image is in fact defined as a composite of greyscale channels one for each of the C, M, Y and K printing plates.

along a line of type, making it more readable, so serif typefaces are particularly suitable as body copy fonts.

Tracking Adjusting the space between characters in a block of text, as distinct from kerning which applies to letter pairs.

Trapping The process of overlapping colours by 'spreading' a foreground colour or 'choking' a background colour to avoid gaps in adjacent colours caused by misregistration on the press.

Trim marks Hairline rules at the corners of a page that indicate where the print finisher should trim the page in the guillotine. Also called crop marks.

Typeface Type design of any size, or weight. Arial bold is a typeface, so is Arial italic. 'Arial' is a typeface family.

Typo Short for typographic error. A typesetting error, for example the wrong font or size, as opposed to spelling mistakes, which are known as literals.

UCR (Under Colour Removal) The process of removing colour from the shadow areas of scans to reduce the amount of ink used and because the colours cancel out.

Vector graphic An image defined by Bezier curves and control points, usually using the PostScript language to provide resolution-independent information to a printer that rasterises and prints it at the highest resolution it is capable of. Fonts are vector graphics.

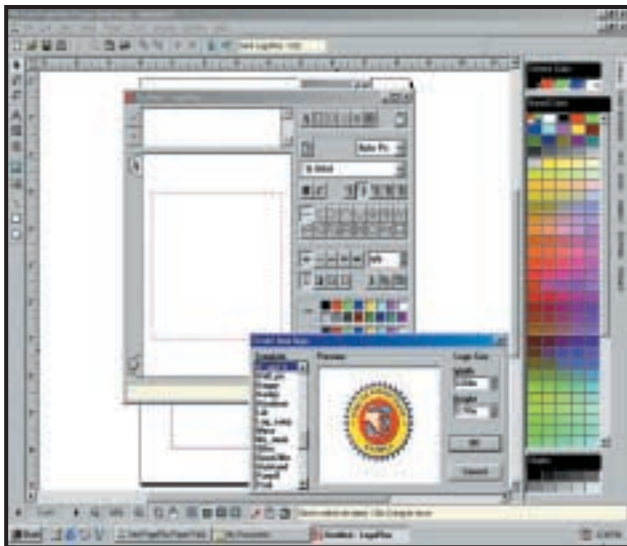
Widow The last line of a paragraph that falls at the top of a new column. In typography this is to be avoided at all costs.

Weight The degree of boldness of a typeface. The majority of typefaces have only two weights – normal, or medium and bold, but it's not uncommon to have more. Typical categories are light, medium, book, bold, extra bold and heavy.

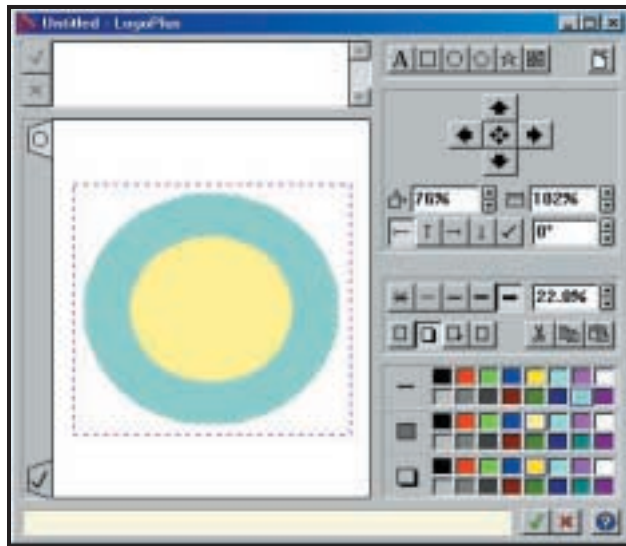
X-height The height of a lower-case character without ascenders or descenders. Traditionally, the height of the lower-case x.

Creating a logo in Serif PagePlus 6

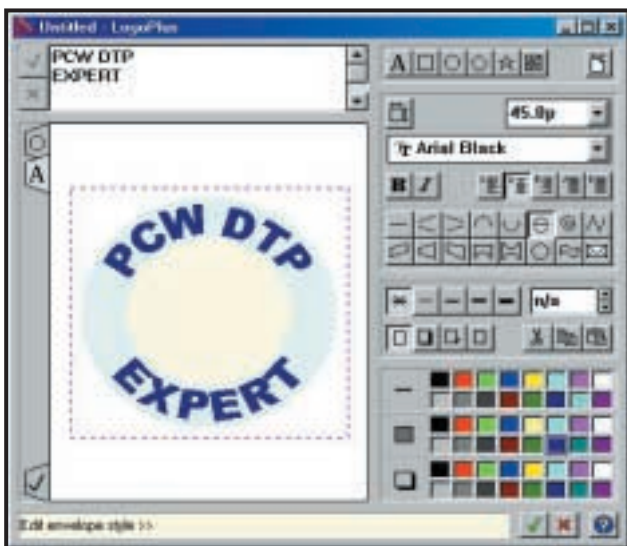
If you want to design your own logo, the steps below will enable you to produce some smart artwork quickly



1 One of the great things about PagePlus is that you can create quick logos, flashes and other graphics without having to learn a complicated vector drawing program. LogoPlus is a simple to use, yet very versatile applet and is exactly the same in versions 5 and 6 of PagePlus. Launch LogoPlus from the toolbar and drag on the page to define the size of your artwork. Take a quick look through the excellent template selection as you might find something you can adapt or even use as it is.



2 We're going to start from scratch, so select the blank template. The first layer has a capital A in the tab to indicate it's a text layer. Click on the oval button to add an oval layer and set its outline width to around 20 per cent – select the thickest line button, then key in the value, or use the nudge buttons until it looks about right, you will need to reduce the size to about 90 per cent. Find a good colour by using the palette swatches.



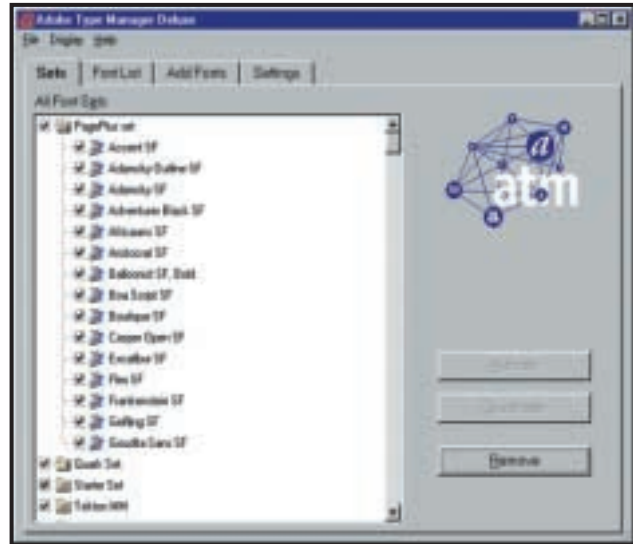
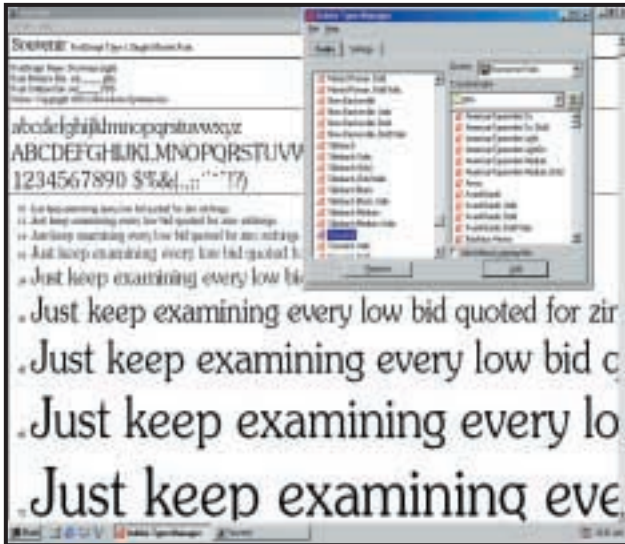
3 Now click on the text tab, then click to place a cursor in the text window just above the preview area and type in your copy. If you want to run text around a circle it looks better if it is all upper case – no descenders and ascenders to mess things up. Click the tick to accept the text, then click the button 'text envelope distortion' from the distortion tools on the right. The top line of text wraps clockwise around the top, everything after the return runs anti-clockwise around the bottom. You'll need to pick the right font and tweak it a little to improve the appearance.



4 Click on the metafile button to import a graphic from the Serif Clipart collection and drag the metafile layer tab to the bottom so that it appears on top. Size it and use the nudge buttons to position it centrally. We have added a couple of stars using starburst layers. Click on the tick tab in the bottom left to preview the entire thing before clicking the green tick in the bottom right to close. The logo will now appear on your page. To edit it just double click and to save it as a metafile, or other format, select 'export as picture' from the file menu.

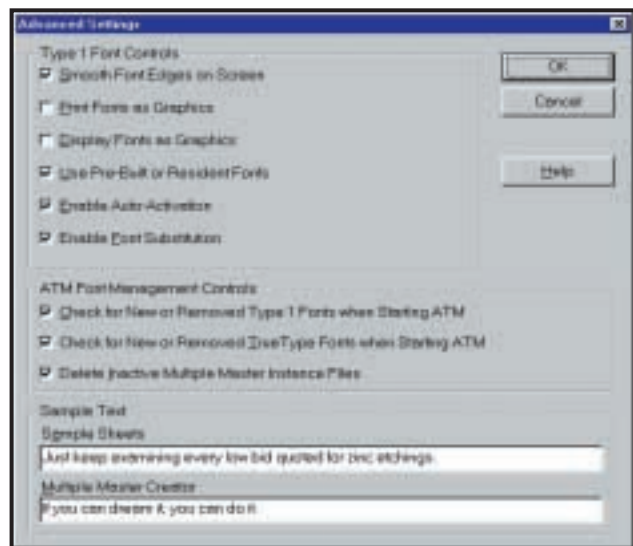
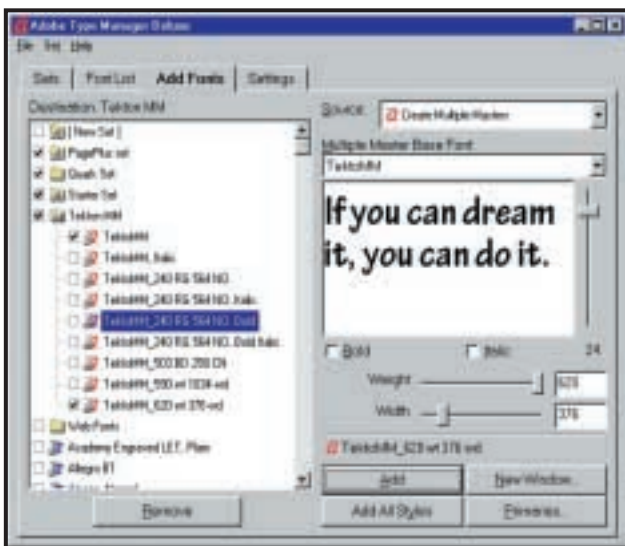
Installing Type 1 fonts using ATM

Not enough room for all your fonts? ATM Deluxe helps you organise them into sets and then turn them on and off at will



1 ATM allows you to display and print PostScript Type 1 fonts on your PC. ATM Light 4.0 for Windows 9x is included with most Adobe applications. To install PostScript fonts you simply browse to the font location, select the fonts you want and ATM copies them into the c:\psfonts directory. The font metric files (.pfm) are all copied into a separate folder. Double-click on a font in the ATM window and you can display and print a sample sheet. That's about as far as it goes, but with ATM Deluxe you have far more powerful features for organising fonts.

2 With ATM Deluxe version 4 you can organise TrueType and PostScript fonts into sets and turn them on and off at will. This is a more organised way of doing things than dumping fonts wholesale into the fonts folder. Graphics applications can install TrueType fonts by the hundred, clogging up your application font menus and slowing things down interminably. To turn on a font set you just double-click on it, or you can expand the set and turn on individual members. In this way you can create font sets for applications, or particular clients or jobs.

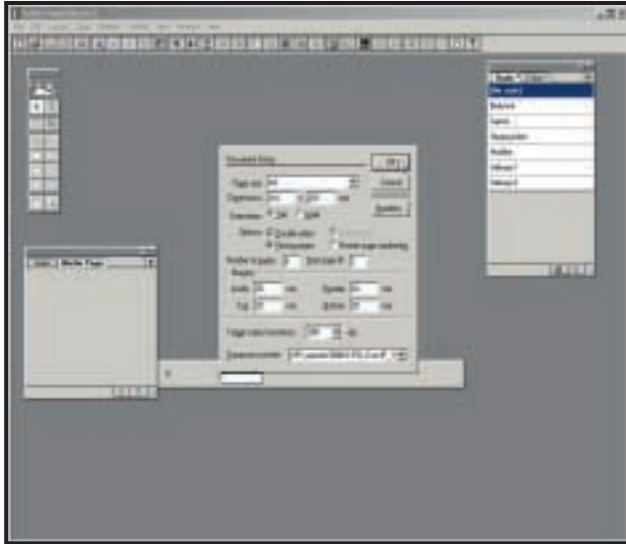


3 With multiple master fonts installed you can alter font characteristics to create new 'instances'. Adobe Tektok is a two-axis MM font – you can alter the weight and width using the two sliders at the bottom of the preview window – the one at the side controls size. Multiple masters come with predefined 'primary instances'. The first number represents the position on the weight axis and the second the width, so the higher these numbers the heavier and more expanded the instance. To create your own instance, position the sliders and click the add button.

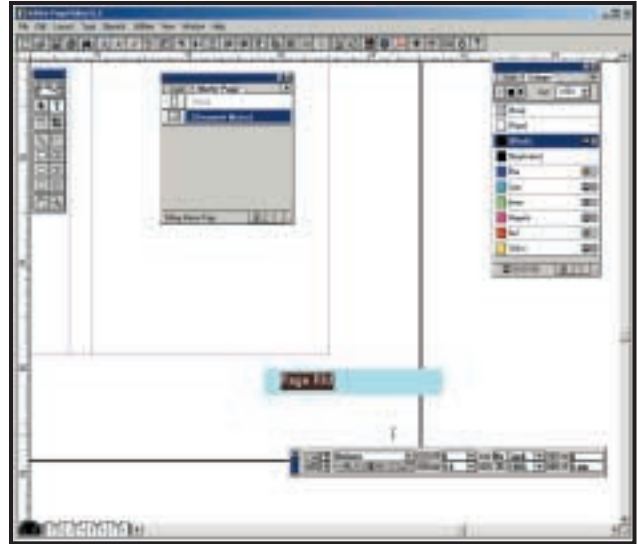
4 Use the settings tab to tell ATM where to find your PostScript font files (.pfb), font metric files (.pfm) and TrueType fonts (.ttf). Click on the advanced button and make sure the 'smooth font edges on screen' box is checked. This will improve the appearance of Type 1 PostScript fonts on screen. If you are running Windows 95 and you want to smooth TrueType fonts on screen, you need to download the free 95 font smoother from www.microsoft.com/typography/grayscale/smooth.htm. Windows 98, 2000 and NT4 have built-in smoothing.

Master pages and style sheets in PageMaker 6.5

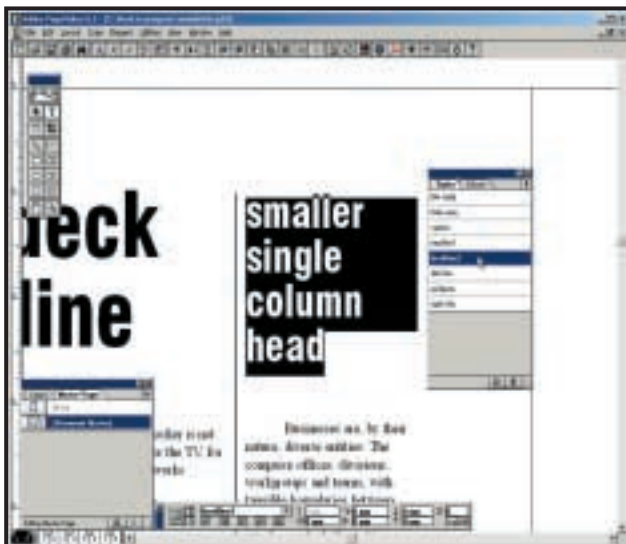
Take the hard work out of creating a professional-looking document by using the techniques outlined below



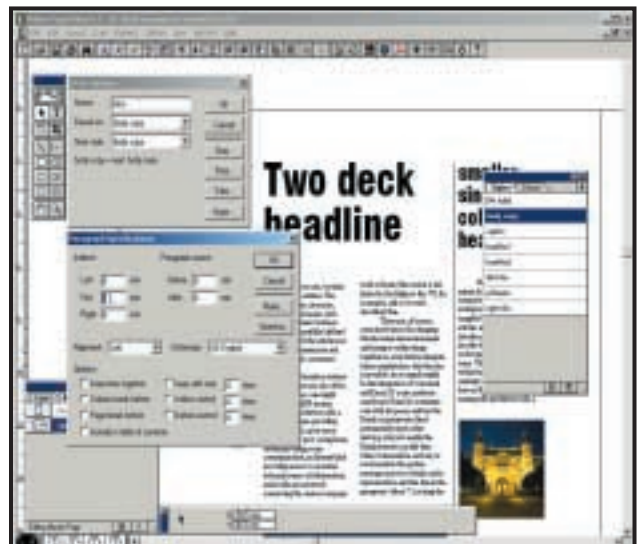
1 PageMaker provides templates for common document types, but frankly, they're not very good. In any case, by using master pages and style sheets you can quickly set up your own template. This one is for an eight-page newsletter and will allow you to import and format copy quickly and easily. Start PageMaker, close the template palette and press Ctrl & N to create a new blank document, select A4 page size, double-sided facing pages and type 8 in the number of pages field.



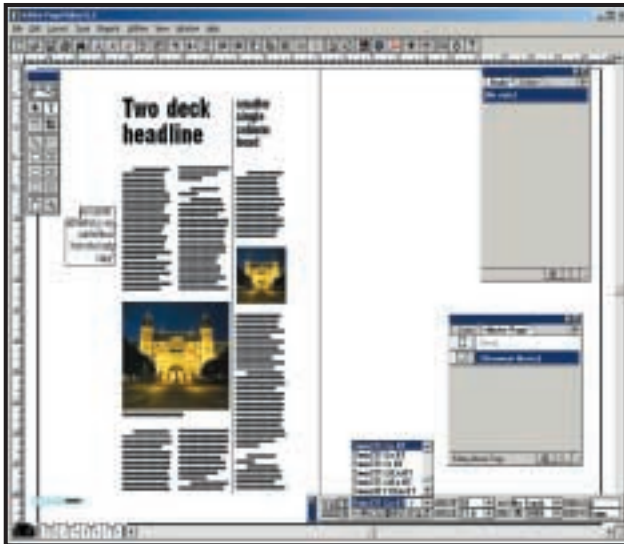
2 Click on the master pages icon at the bottom of the document window and press Shift & Ctrl & 8 to display the master pages palette. Double-click the document master icon to display master page options and set the number of columns on both pages to 4. Select the text tool, zoom into the bottom left corner of the left master page, click to create a text block and type Ctrl & Alt & P to add automatic page number marker. Use the control palette to set font and style. Ignore style settings in the paragraph format display. Copy the left page number marker and right-align it on opposite page.



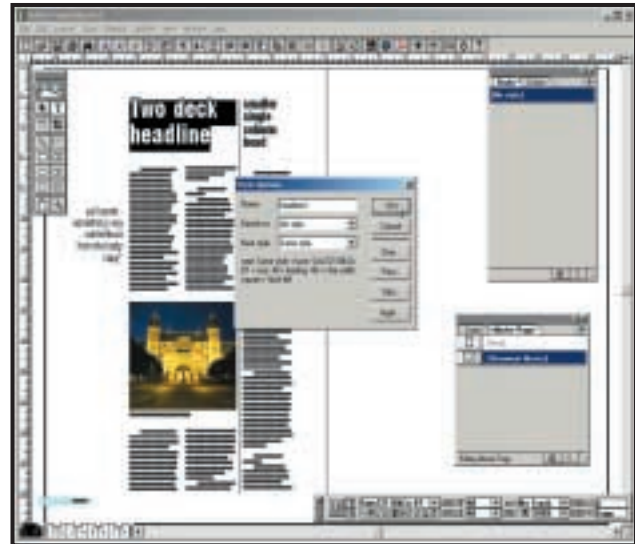
5 Create styles for all the other text elements in the same way. Next we have to apply the styles to the copy. Place the cursor in the main headline and you will see in the style palette that no style is applied. Click headline1 and do the same for all the other elements applying the appropriate style. Unless the styles are applied, changes you make to the style sheets will not update on the page. Make sure to select all the body copy when applying the body copy style sheet.



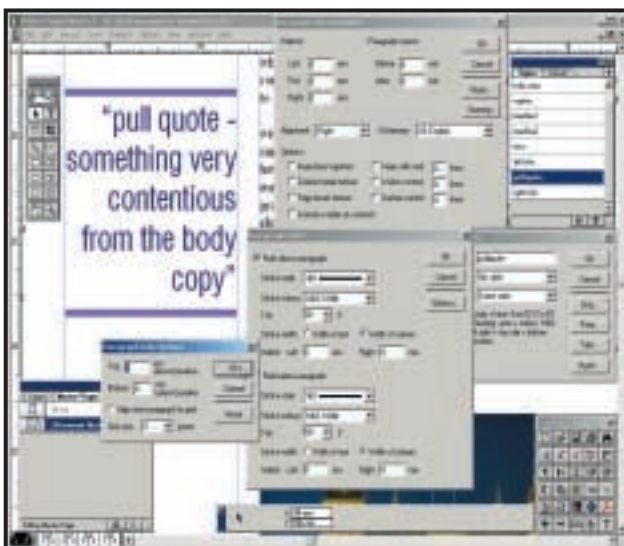
6 Now we're going to create a new style for the first paragraph of text based on the body copy style. Select new style from the style palette menu and call it 'intro'. In the 'based on' field select body copy from the pull-down menu and select body copy as the next style. Then click the para button and set the first line indent to zero. This ensures that the first paragraph of each story is set 'full out' (a design convention), and that the following paragraph is in the body copy style. Don't forget to apply the new intro style to the first paragraph once you've created it.



3 Delete all the existing style sheets and add dummy content to the page for each text element you are likely to need for your publication. If you forget anything you can add it later. We've created two headline styles – one for major stories and another for smaller, single-column ones – body copy, crosshead (a subheading used to break up long swathes of text), a caption and a pull quote in the margin. We've also put in pictures to give a better idea of how the page will look. You can move all these elements around or remove them on the actual pages.



4 Now we can start setting up the style sheets. Select the first headline type and press Ctrl & B to show the styles palette if it's not already visible. Select new style from the palette menu and give it a name 'headline1', or something similarly descriptive, then click OK and the style will appear at the top of the palette. It's as simple as that – you've set up your first style sheet. The style sheet takes all its settings from the highlighted text, doing all the work for you, but we're not finished yet.



7 Next we're going to make some changes to the pull quote style sheet. Double-click on the pull quote style in the palette and click the char button in the style options panel. We've selected a new process colour for the text that we previously defined in the colours. Next, click on the para tab, then on the rules button. We've added a 4pt rule top and bottom in a 50 per cent tint of the blue colour. You'll need to offset the rules above and below the baseline using the paragraph rule options. Now, when you apply the pull quote style, all the work is done for you.



8 You can copy and paste everything onto the opposite page to create the right master page template. In our example both outer columns are left empty for the pull quote. We have created a ranged left pull quote style sheet, based on the original one, for the right-hand page. Now, if you select the first spread – pages 2 and 3 – everything is in place ready for you to import body copy and overtype headlines. Don't stop at one set of master pages. For a newsletter it's a good idea to have two alternative spread designs, and a front and back cover.

Preflighting with Markzware FlightCheck

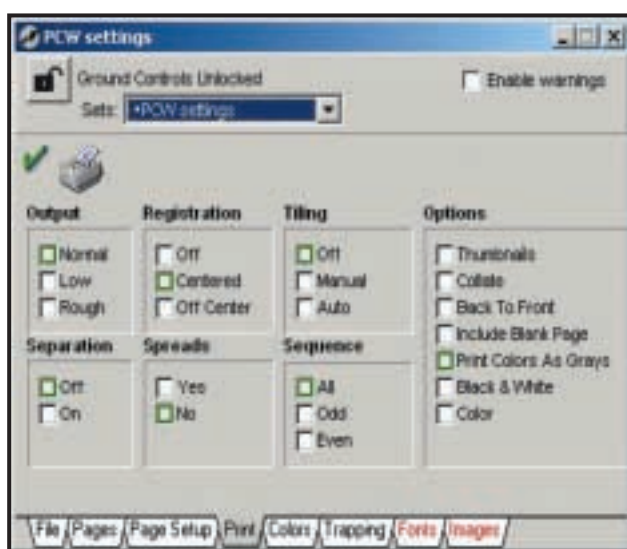
Finding out about a problem once your document has gone to a bureau is too late, but these last-minute checks can help



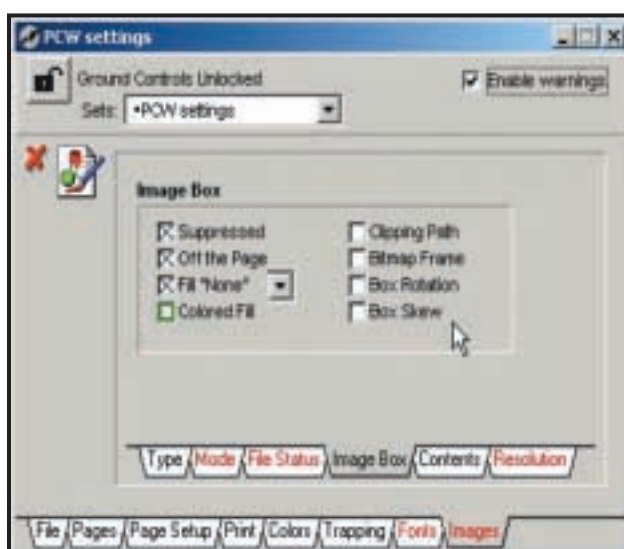
1 Download a trial version of FlightCheck from www.markzware.com. To generate a report drag your document onto the eagle in the FlightCheck window. The results window reports on problems in eight categories. If you're sending a job to a bureau you will probably be most concerned with colours, trapping, fonts and images. A green tick shows that everything's OK, a red cross means you've got problems, possible solutions to which are given on the right. You can expand the list to show affected files and a further explanation appears in the bottom window.



2 FlightCheck's main window contains six category buttons giving details of each aspect of the document in a stacked window arrangement. Red entries indicate problems. The colours window shows that our document has one spot colour in addition to CMYK process colours and that it has been used on text, the icons on the right show elements and trapping information for the colour. Double-clicking on any item gives more info in a separate window – here there is a Photoshop eps with an effective resolution of 118dpi.



3 Press Ctrl + G to call up the ground controls palette where you can configure FlightCheck's reporting. The default settings provide too much information in too much detail for most people's needs, and reducing the overload will help you deal with the important stuff. You probably don't need file, page setup and print information as your bureau will re-set these, so turn them off. Where there are problems in your document the checkboxes are outlined in red. As you uncheck them the report lines will disappear from the main and results windows.



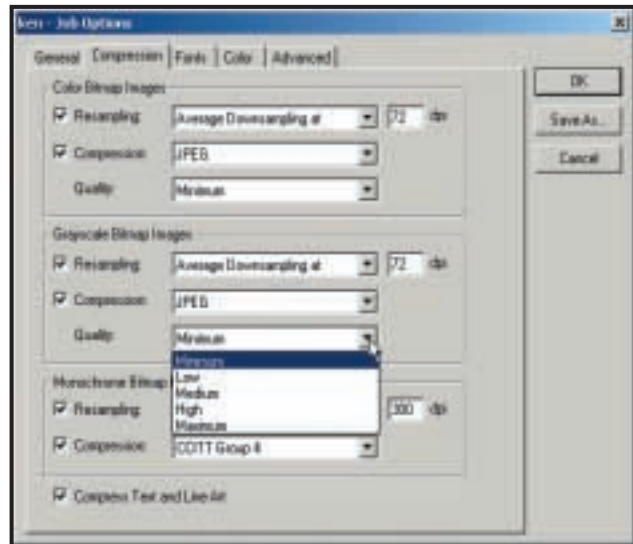
4 Be careful about what you turn off. The image ground controls uses six tabbed panels to accommodate all the settings. It may not matter what file format your images are in, and you're probably aware if they have been scaled or rotated. If they've been saved with alpha channels, clipping paths or transfer functions the chances are it's deliberate. But if they are in RGB or index colour format, less than 300dpi, in 'none' filled picture boxes, or missing altogether, you'll want to know. Intelligent use of FlightCheck's ground controls is the key to effective preflighting.

Producing a pdf using Acrobat 4

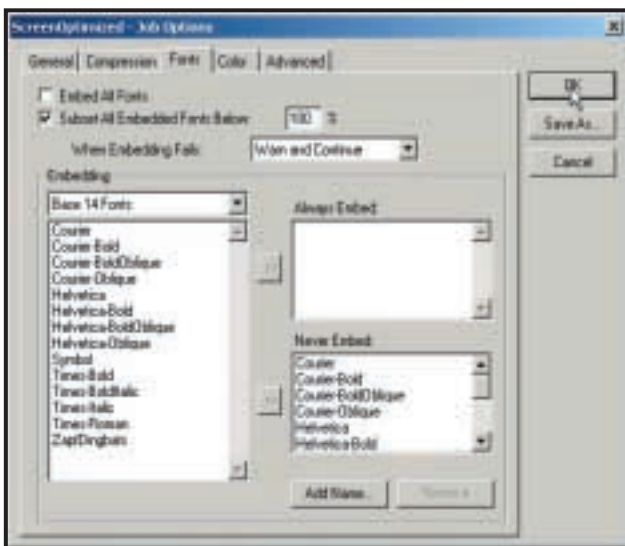
Creating pdfs rather than film for the printing process - not to mention the Internet - is the future, so here's how it's done



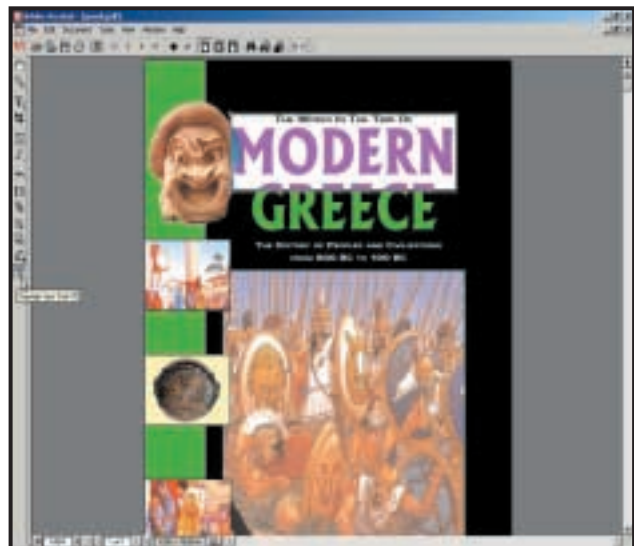
1 The first step is to print the document to disk as a PostScript file. The Generic PostScript printer driver has been configured in the Properties dialog to print to a file and the Acrobat Distiller PPD (printer description file) has been chosen. Make sure your document will fit on the page - easily checked if you're using Xpress 4 using the preview panel. Bear in mind that bitmapped graphics will be downsampled to screen resolution, so don't reduce your document to smaller than screen viewing size or they will pixellate.



2 Distiller has three pre-sets, optimised for commercial press, composite printing and screen viewing. If you are using pdf as a pre-press 'wrapper', use the first of these, for the web use the last. You can fine-tune the compression settings by selecting job options from the settings menu. For the smallest possible files, but worst picture quality, start with the screen pre-set and change the compression to minimum quality jpeg, then save the changes to a new pre-set.



3 Font embedding has an impact on both the size and appearance of your pdf files. If you choose not to embed fonts the pdf will be smaller, but fonts won't appear on the viewer's screen exactly as they do in your document, (unless they have the fonts installed). Adobe's multiple master fonts will create a representation of them based on generic serif and sans serif font masters. The important thing is that the line breaks and layout will be exactly preserved. You can embed a subset of only the characters used, but this limits editing options later.



4 Use the Acrobat application to crop your document, add hypertext links, annotations and digital signatures. Acrobat 4's editing tools are much more versatile than those of earlier versions and you can edit text and graphics using the touch-up text and touch-up object tools. If you intend to edit text make sure you embed the entire font, otherwise you won't be able to add characters that are not included in the subset (unless the fonts are installed on the viewing/editing machine).



hands on

The *Hands On* section gives you a chance to have your say in the magazine. All our columnists have contact details at the end of their columns and rest assured that, while we can't answer all the mail we receive, we try our best to respond as often as possible. But it's not just a one-way street, if you've got a groovy tip or a time-saving shortcut that we haven't covered yet don't keep it to yourself, let us all into the secret.

This month sees some more changes to the *Hands On* section. Due to popular demand we've expanded Question Time (p276) to include two extra pages so that we can cover more of your queries in greater detail. But don't worry, we'll still cover the more difficult issues in the main columns.

With the now widespread availability of WAP phones, like the Nokia 7110 and HTML-enabled phones such as the Sony CMD-Z5, we've expanded the remit of the PDA column (p319) to include all types of mobile data devices.

We hope you like the changes, but feel free to get in contact with your suggestions for ways we can improve the section even further.

NIALL MAGENNIS, FEATURES EDITOR

NIALL_MAGENNIS@VNU.CO.UK

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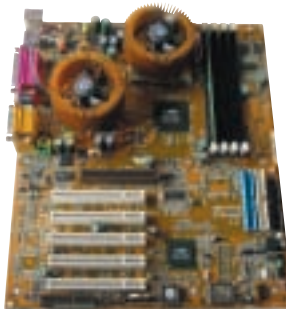
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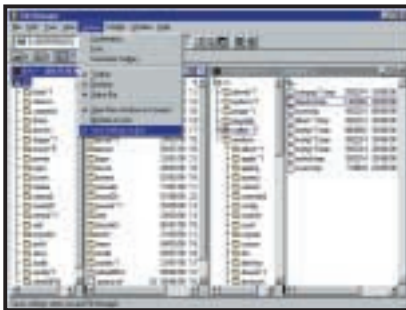
Advice from our experts

Got a problem? Our *Hands On* experts answer your questions and solve your problems

Windows

Q I have recently acquired a PC that runs Windows 98. My previous PC ran on Windows 95, with three hard drives, and I used File Manager extensively to drag and drop files between folders on these drives. I find that Windows 98 does not have File Manager as such, but I am told that it can be activated to produce the File Manager icon at the top of the screen. Can you please tell me whether this is correct and, if so, how this can be accomplished?

John Branton via email



Better behaved than Explorer when it comes to saving settings

A All you need to do is create a shortcut to winfile.exe, which should be in your Windows folder. Drag the file onto the desktop and it will create a shortcut to the File Manager. A tip here – get the File Manager sub-windows arranged the way you want them and make sure Options, Save settings, is ticked before you close it.

Q If I make a shortcut to C:\Windows\Notepad.exe on the desktop and make the 'Start in' property point to a certain folder – for example, D:\Docs – then open Notepad using that shortcut and go to File/Open, the default folder offered will be D:\Docs. However, this only seems to work on my Windows 95 machine. On my wife's Win98 PC this does not work, the File/Open command always defaults to C:\My Documents, no matter what folder is entered in 'Start in'. How can we set up a Notepad shortcut in Win98 to default to a chosen folder for File Open/Save?

John Moss via email

A Yes this is annoying. It worked in Win95. It worked in Win 3.x. But changed with the advent of the My Documents folder in Windows 98. However, there is a way round it. Right-click in the folder you want to start in, then choose New, Text Document, from the menu. Rename the new file to whatever you want. Right-drag it to the folder of your choice and create a shortcut. Double-click on the shortcut, and the file will open; exactly as a new instance of Notepad, except you'll get 'Name – Notepad' instead of 'Untitled – Notepad' in the title bar. Go to File, Open and you'll be 'in' the target folder.

Q Internet Explorer 5 used to have a bar at the bottom of the screen showing where a link went to. However, this bar has now disappeared. It's irritating as it used to show the lock when on a secure site. How can I restore this missing bar?

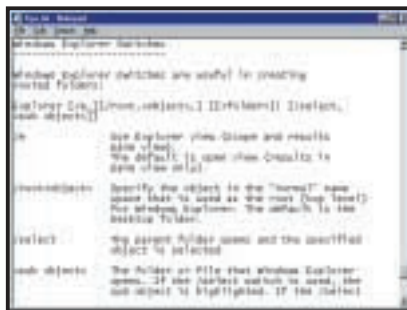
Thomas Franey via email

A Easy – just make sure that the 'Status Bar' option is ticked in the View menu.

Q I'm curious about some switches used for the Explorer shortcut on page 238 of the May 2000 issue of PCW, where /n,/e,/select,C:\ is listed. How can I learn more about the different switches available, and how did you find out about them?

Steve Clarke via email

A What! You want a journalist to reveal his privileged sources? Well, just this once. I found them in a file named tips.txt which gets copied to your



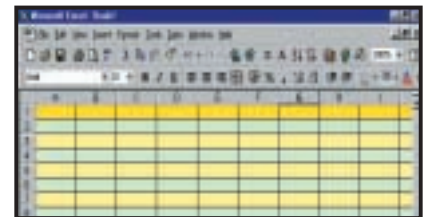
The top-secret file in your Windows folder

Windows folder when you install Windows 95 or 98.

Spreadsheets

Q How can I colour alternate rows on an Excel spreadsheet without losing the gridlines between cells?

Mrs J Taylor via email



A Excel assumes you wouldn't want a decorative spreadsheet spoiled with mundane lines. But you can create the effect as follows. Display the Formatting toolbar. Click on the Row Number of row 1. Click on the Fill Colour palette tool and select a colour. Click on the Borders tool and select the underline. Repeat this for row 2 and so on. To handle more than a row at a time, hold down the Ctrl key and click on the required row numbers. For vertical gridlines, click on the Column Letters and select a side border. Whether all this will print on a hard copy depends on your printer driver.

Q How can I edit a hyperlink on an Excel spreadsheet? When I point to it, the pointer changes to a hand.

B Nzewkwu via email

A With the hand showing, right-click and choose Hyperlink, Edit Hyperlink. Then make the change. Alternatively, you can click on the cell next to the hyperlink and use an arrow key to select the hyperlink cell and press Ctrl & K. Either method will display the Edit Hyperlink dialog box with the specific link shown.

Q The right-hand side of the Excel, File, Open dialog box always says, Preview not available. How can I make one display?

H Conrad via email

A Open any Excel workbook. Choose File, Properties and the Summary tab. Check the Save Preview Picture box.

Word

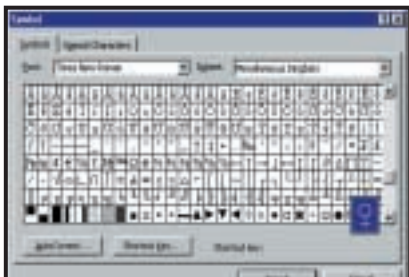
Q Sometimes Word crashes and disappears (no surprise there) but when I go to restart it I'm locked out of the document I was editing and have to make a copy in order to continue working on it. Short of a reboot, which is time-consuming and inconvenient, is there any other way of getting around this?

Mik Webster via email

A It sounds as if Word hasn't shut down completely, even though its window has disappeared. Press Control & Alt & Del to see a list of running applications and End Task for any Microsoft Word entry, which may or may not have a document mentioned. Wait for the confirmation box, press End Task again and you should be able to restart Word and resume work normally.

Q Where can I find the male and female symbols?

Jane Geary via email



Men are from Mars, women from Venus and both can also be found in Word's Miscellaneous Dingbats section

A If you mean the scientific symbols, then these are actually in the Windows Unicode core fonts (Times New Roman, Arial, Courier and Lucida Unicode) and you can get at them through the Insert, Symbol dialog in Word 97 or 2000. You'll find them in the Miscellaneous Dingbats section. If you mean the things you see on toilet doors, then there's a pair of skirted and trousered silhouette figures in the Webdings font, which also ships with Windows 98. The latter you can access in any application, by switching to the Webdings font and typing Alt & 0128 or

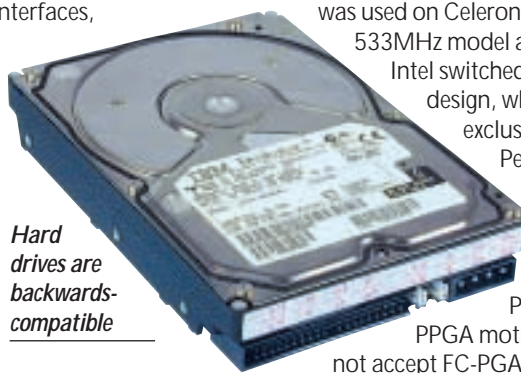
Alt & 0129 on the Numeric keyboard.

Hardware

Q I have a motherboard that only supports UltraDMA33. I want to upgrade to a larger capacity hard disk, but they are all UltraDMA66, or even UltraDMA100. Do I need a new motherboard?

Miroslav Graovac via email

A The good news is that you don't need a new motherboard. While almost all new IDE hard disks do indeed use the UltraDMA66 or even UltraDMA100 interfaces, they are thankfully backwards compatible with older UltraDMA33 controllers. You can fit the drive and have it working perfectly, albeit limited to the UltraDMA33 bandwidth of 33Mbytes/sec.



Hard drives are backwards-compatible

Q I bought a PC with an nVidia GeForce 256. The system came preconfigured with Windows 98, but I upgraded to Windows 2000 at my first opportunity. Now I'm stuck in 16bit colour VGA mode. I've downloaded the latest Windows 2000 driver for the card from the Microsoft website, but all I get is an error message.

Gain Lee via email

A Head straight to nVidia's website at www.nvidia.com and download the latest Detonator 2 driver for Windows 2000, which in our experience, works with almost every nVidia card, from the TNT to the GeForce2 GTS. On our systems it works problem-free under Windows 2000 and has even improved gaming performance in some cases.



nVidia supplies drivers for its cards that support Windows 2000

Q Can you please explain which processors go in which sockets as I am totally confused by socket this and slot that!

Tony Pollock via email

A The first Celerons and all Pentium II and Pentium III processors come in Slot 1 packages. Intel, however, now favours socketed interfaces, and uses the Socket 370 for all but the oldest Celerons and also offers new Pentium IIIs in this form factor. Note that there are two versions of CPUs that use the Socket 370: Plastic Pin Grid Array (PPGA) and Flip Chip-Pin Grid Array (FC-PGA). PPGA was used on Celerons up to the 533MHz model at which point Intel switched to the FC-PGA design, which is also used exclusively for socketed Pentium IIIs. While an FC-PGA motherboard can also talk to PPGA CPUs, a PPGA motherboard will not accept FC-PGA CPUs.

AMD introduced its Athlon CPU in a cartridge like the original Pentium II, but the connection is electrically incompatible - AMD calls it Slot A. With the launch of the Duron CPU and new Athlons with the enhanced Thunderbird core, AMD has also gone socket-crazy, opting for a 462-pin design called Socket A. While historically confusing, the situation today is that all new Intel Celeron and Pentium IIIs will work in an FC-PGA motherboard, while all Duron and Thunderbird Athlons work in a Socket A motherboard.

Q I would like to fit an extra cooling fan to my PC. What would you recommend and where do I plug in the fan power supply socket?

E T Jones via email

A The simplest way to do a cooling upgrade is to get hold of one or two case fans that screw into pre-drilled holes in the back or front of your system. Normally one pulls in fresh air, while the other expels nasty hot air. They usually



connect to the same power plugs that your drives use and, being low-power, can normally share a cable with an existing hard disk or CD-ROM drive. Fans of fans should head for their local computer fair where models are available from around £5.

Databases

Q I am trying to share an Access MDB file across the network so that two people can use it at the same time. I have put it on a shared drive. Either person can open it on their own, but they can't open it at the same time. Any ideas?

Paulo Chump via email



You can ensure your database can be accessed by multiple users from here

A You don't say what happens when they both try, but it's likely that Access is opening the file in exclusive mode which, as the name suggests, excludes anyone else from using the file.

From each workstation, open the file and select Tools, Options, Advanced and set Open Mode to Shared and the default Record Locking to Edited Record.

Unix

Q OK, I must admit that your Unix column persuaded me that Linux will make a great way to get started with a Unix-like operating system. But there are Windows applications such as Microsoft Word and Excel that I have to run for business reasons. Please don't tell me that Star Office is just as good. I need the real McCoy.

Yousif Naswan via email

A We've discussed ways of running Windows applications under Linux in the column. For several years now our columnist Chris Bidmead has been using



Use Windows apps on Linux with Win4Lin

Windows Terminal Server with Citrix Metaframe to deliver Windows NT applications across a LAN to his Linux workstations (www.citrix.com). A free software alternative worth looking at is VNC (www.uk.research.att.com/software.html).

A Windows application environment called Wine (www.winehq.com) is supplied with most Linux distros – unfortunately it will only run a limited subset of Win9x applications. But Joakim Pietras (joakim@piman.demon.co.uk) has written in to recommend something new that might fit the bill. Trelos (www.trelos.com) offers a commercial product called Win4Lin that claims to be able to run any Windows 9x application that doesn't depend on sound or DirectX. We had some trouble installing it – you need a patched version of the kernel (supplied by Trelos, or patch your own) and the first Win4Lin release sent for review didn't work with non-US versions of Windows 98, but it's running well now on Chris' Mandrake 7 system.

Over to Chris though for the final assessment: 'All I need to do now is find a use for it – these days there aren't any Windows applications I want to run and the idea of having to mess with entities with names such as "drive C:" sends shivers down my spine. :-)'

Graphics and DTP

Q What are the best fonts to use for web pages? What happens if I design a page using a font that the viewer doesn't have? Is there a way to download fonts with a web page, or is it better to convert text to a gif, so I don't have to worry about fonts.

Peter King via email

A To take the last question first, converting text to gif files will ensure it appears in your viewer's browser

as intended, but there are a number of drawbacks. Even the smallest gif file will take longer to download than HTML text, it won't look too good when printed and won't be seen by search engines.

The trick is to use fonts that are likely to be on most PCs and Macs and that are readable onscreen at a variety of sizes. For small body copy this means sans-serif fonts, as serif fonts, eg Times New Roman, don't look good at small sizes.

Arial, Verdana and Trebuchet all fit this description. Whether using FONT tags or Cascading Style Sheets, list fonts in your preferred order, eg Verdana, Arial, Trebuchet, sans-serif. The browser will use the highest available font in the list.

Two technologies for downloading fonts are currently being developed – Embedded OpenType, by Microsoft and TrueDoc by Bitstream (www.bitstream.com). There is information and an article about Embedded OpenType on the Adobe website at www.adobe.com/web/features/css3/page2.html and you can download Microsoft's Web Embedding Font Tool (WEFT) from www.microsoft.com/typography/web/embedding/weft2/default.htm.



Download Microsoft's Web Embedding Font Tool from its website

Windows 2000

Q Since installing Windows 2000 Pro my system has slowed. It seems that the hard disk and its IDE channel are talking to each other in PIO mode. DMA mode does not appear to be available as an option. Also, the CD-ROM is temperamental when installing software. The error messages typically refer to ATAPI and other failures from the CD-ROM.

Gary Sanders via email

A Windows 2000 works great with DMA but the setting is hidden! In Device Manager, open IDE ATA/ATAPI controllers and select properties for the

Primary IDE Channel. Click on Advanced Settings. Select 'DMA if available' for both devices. Do the same for the Secondary IDE Channel. Reboot and Windows 2000 will try to use DMA. Startup may be delayed. Go into Device Manager/IDE.../Advanced Settings again, cross your fingers and check the Current Transfer Mode. If it isn't DMA then your PC BIOS may be set to PIO or the hard disk may not support DMA.

For DMA to work, the operating system, hard disk and the IDE channels must be DMA-enabled. The Integrated Peripherals menu of the PC BIOS has Master and Slave settings for the Primary and Secondary IDE channel. Set all four to AUTO. Remember the old setting in case the operating system won't boot!

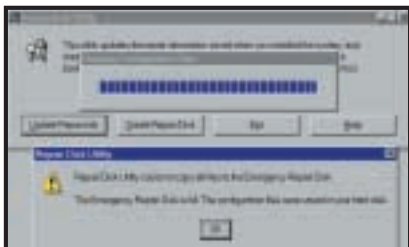
UltraDMA66 presents a new set of constraints. The drive and BIOS must support it, you have to use a special cable and UltraDMA66 must be enabled with a Registry fix that you can find in KnowledgeBase article Q247951 (at <http://support.microsoft.com>). Some motherboard/drive combinations require a motherboard BIOS update and some won't ever work. For best performance attach hard drives to the Primary IDE channel and CD-ROM and other ATAPI devices to the Secondary. Incorrect Master and Slave settings on drives may also cause erratic performance.

Windows NT

Q I tried to create a repair disk using a 3.5in floppy but it reports that the Repair Disk is full (see screenshot below).

What are these files and how can I back them up in a way that I can recover the information if NT gets itself into a non-bootable state? Are these the files used if the 'last known state' option is used?

Andrew Small via email



A This occurs when the size of the files in the %SystemRoot%\Repair folder exceeds the capacity of one floppy disk. This is a very common problem, caused by the pitiful size of the standard

floppy disk drive which has been stuck at 1.44MB since the last century. One way round this is to install an ATAPI LS-120 SuperDisk – with a capacity of 120MB, Windows NT will have its work cut out filling that! They cost about £60 ex VAT.

Another way round this is to store the update of your repair information on your hard disk. In most cases you can use the updated repair information on your hard disk when you repair your Windows NT installation. To do this, use the Update Repair Info option in the Rdisk.exe tool. Make a backup copy of the %SystemRoot%\Repair folder.

FILE	DESCRIPTION
Autoexec.nt	Startup file for MS-DOS-based programs
Config.nt	Startup file for MS-DOS-based programs
Default._	Hkey_Users\Default registry hive
Ntuser.da_	New user profile (Windows NT4 only)
Sam._	Hkey_Local_Machine\Sam registry hive
Security._	Hkey_Local_Machine\Security registry hive
Setup.log	Configuration and repair information file
software._	Hkey_Local_Machine\Software registry hive
system._	Hkey_Local_Machine\System registry hive

Figure 1: The vital files needed to rescue a Windows NT installation

You could reduce the number of files copied – if you use RDISK /S – it copies the Sam._ and Security._ database files to your Emergency Rescue Disk (ERD). Simply don't use the /S switch! Check out this document, Q122857, on the Microsoft KnowledgeBase for details of using the RDISK /S and RDISK /S- options. Remember: the ERD provides just enough recovery to restore your PC to a bootable state. It isn't a replacement for regular backups.

Maintaining a current ERD is just as important as having a current system backup. Whenever system configuration changes are made you should update your ERD with the RDISK utility. You should also update the repair information and create a new ERD every time you change the system configuration in any significant way. Figure 1, above, lists the files used to repair a Windows NT installation.

Networking

Q Earlier this year I networked two Windows 98 computers together for playing games between my flatmates, I am now looking to add a new computer to that

network and have the following queries. First, can I use the existing Cat 5 crossover cable that I used for the original networking? And second, is it possible to set up an email client so that, no matter who signs onto the Internet, all the emails can be downloaded and then distributed to the correct machines? We will be using Outlook 97, 98 and 2000.

Steve Edgar via email

A Sadly, Steve, the trick of using a Cat 5 crossover cable to link two computers can only be done to link two computers – with the cable plugged in to the single socket on each network

interface card there's nowhere to plug in any more computers! Sorry old bean but you're going to have to invest in some longer (normal) Cat 5 network cables and a cheapo hub – you can pick up an eight-port 10/100Mbps/sec port for about £120 ex VAT. If you

were looking to the future and the possibility of installing say BT's HomeHighway, then consider getting a hub with an ISDN router built in – these cost from about £250 ex VAT.

As to the second question, I don't know of any way of segregating incoming mail to different PCs. Sure, Outlook Express 5 has an Identities feature that allows several people using the same PC to read their own mail and nobody else's. But it won't distribute them to their respective PCs. This is more complicated than you might think – I assume that each user has a separate, unrelated email account, eg tom@freeserve.co.uk, dick@demon.net and harry@lineone.net. It would be administratively awkward (and pointless) for a mail server to dial three ISPs, download the owners' email and deliver it all to their workstations. A better solution would be to open a series of related accounts, eg tom@friends.freeserve.co.uk, dick@friends.freeserve.co.uk etc. Then you could download them to a mail server and distribute them. Check out SLMail, a low-cost (£125) mail server for Win9x at www.seattlelab.com. But this is overkill, I guess, for what you have in mind.



Sound

Q I've tried running Cubase VST 3.7 r 2 under Windows 2000 and, while the program starts, it crashes as soon as I try to do anything. Is there any way to get Cubase running under Windows 2000?

Alex Manc via email

A Cubase 3.7 may run under Windows 2000, but it's really pot luck as to whether it runs stable or not for a number of reasons. In fact, it shouldn't really run at all.

However, Cubase V5 is fully Windows 2000 compatible, but before you start getting all excited, there are a number of gotchas that have to be sorted out before it becomes worthwhile to move to Windows 2000 as a platform for music. For one, Windows 2000 uses the WDM driver format for sound cards and MIDI and very few cards have a fully functioning WDM driver available at the moment. You may be able to use NT drivers for MIDI devices under Windows 2000, but you're likely to experience timing glitches.

Also, very few multichannel audio cards have drivers available for Windows 2000. For example, at the time of writing, there are beta drivers available for the Echo range of cards, but this driver does not include ASIO support. By all means check to see if your MIDI and audio equipment is supported fully under Windows 2000 and if it is then go for it, but otherwise stick with Windows 98SE.



Cubase V5 is Windows 2000 friendly

Q I hope you can help me with a problem that is driving me nuts! I had an old ISA sound card in my computer. A few months ago I began to get a 'distorted' noise from my speakers, so I borrowed a pair from my neighbour to find the same problem. So presuming the sound card was knackered I went out and bought a new PCI 128. Having

followed the installation to the letter all was fine for a week or two. Then mysteriously one day the distortion came back again.

I checked within device manager and could find no problems with any conflicts and I even changed the resource settings to no avail. I have now re-loaded my sound card for the umpteenth time and even changed the IRQ to 10 by forcing it this way through my BIOS, which is the latest version. This was a very hairy procedure as I'm not a technical person! I also tried changing the PCI slot.

Is there is a conflict somewhere? My system is a two-year-old Pentium 233, 64MB of RAM, one PCI slot free, others hold my sound card, modem and Voodoo 3 2000 graphics card. I hope you can help me because I now do not know what else to try.

Mike Pitt via email

A We're pretty stumped by this problem. All we can suggest is that you take out all your cards except the sound card and the graphics card and then reboot the PC. If you're still getting the noise we would say it's probably some kind of conflict with the video card, so try forcing one or the other to use a different IRQ. If the noise doesn't return then it's probably a conflict with one of the other cards. Replace them one by one until the noise returns to find out which is the culprit.

Another possibility, of course, is that the sound card is picking up the noise from an external source, although this is unlikely as the latest PCI sound cards are pretty well shielded against outside sources of noise.

Q I was wondering if there was any way that you could put MP3 files onto CD so that they play in a regular CD player.

Mike Johnson via email

A It depends on what you mean. You can get software such as Adaptec's Easy CD creator to expand MP3s back to wav files and burn them onto CD on the fly. The resulting CD will be a normal audio format CD.

But I think what you're really asking is whether you can get MP3 files onto CD in a way where they are still MP3 files but you can play them in a normal CD player. The answer to this is no.

But CD music players are starting to appear that will allow you to play back CD-ROMs of MP3 files. The Terratec MP30 is an example of this. Check out www.terratec.net for more details.



Terratec's MP30 will play CDs as well as CD-ROMs of MP3s

Q I'm interested in trying out some of the music apps on BeOS as I've heard that the OS is specially designed for media applications. The trouble is that I'm not very technical and worried that I might mess up my installation of Windows. I'm also concerned that my hardware won't be supported. I've got a TNT2 graphics card and a Darla sound card from Echo.

Charles Trust via email

A BeOS 5 Personal Edition installs just like an application under Windows, so you can try out BeOS without worrying about having to partition your hard drive. If you don't like it you can uninstall it just like an other Windows application. It was on July's cover disc. The other good news is that both your TNT 2 graphics card and the Echo Darla are supported under BeOS. In fact BeOS comes with support for both of these as standard so you won't even need to add any drivers.



There are plenty of decent audio applications available for BeOS, such as ObjektSynth (above), but unfortunately Be has decided to concentrate its energies on the Internet-appliance market and, as a result, both Steinberg and Emagic have announced that they have ceased work on ports of their popular audio and MIDI-sequencing applications to BeOS.

CONTACTS

All of our experts welcome your queries, simply respond to the appropriate address at the end of their *Hands On* columns.



The easy way to SuSE

If you've got our DVD edition you've got SuSE 7.0. Chris Bidmead leads you to Linux happiness

A SuSE distribution has always been a great way to get started with Linux. With the DVD edition of this month's *PCWSuSE* is offering you its latest version 7.0 Linux distribution as a taster for either the easy-to-install and use SuSE Linux 7.0 Personal Edition, on which our cover DVD version is based, or SuSE Linux 7.0 Professional, designed for 'advanced home users and IT professionals'.

The version you have here is packaged in a form designed to make it easy and safe to install on a system already running Windows. It won't time out and it's not crippled in any way, although it will run rather slower than a fully installed version as it retains most of its working files on the CD. The invasion of your hard disk is limited to the creation of a few files within your existing filesystem on the lowest partition it can find.

Certainly it's not as complete as the full Professional version with its six CD-ROMs, a DVD and four manuals, or even the easy-to-use Personal Edition for home and office users on three CD-ROMs. Both these sets come with professional installation support, but the version we have here minimises installation problems by sparing you the need to create partitions on your hard

Most of the data will stay on the CD so you won't have to spend aeons waiting

drive for Linux. This is something you'll want to do when you come to install the full-blown version, but by then you'll have learnt a little more about Linux and be in a position to use tools like *fips* that enable you to shrink existing partitions to make room for new ones.

I'll assume that you've managed to transfer the ISO image from our DVD onto a CD (if not, see below), and that you have a modern PC that can boot from the CD-ROM drive. If Linux hasn't begun to load after a few seconds you



Evaluation SuSE 7.0 is available from www.linuemporium.co.uk for a minimal price so you can try it out in the comfort of your home

might need to look at the boot order setup in your BIOS and change it, putting the CD-ROM device first.

Booting from the SuSE 7.0 CD-ROM should take you into a colourful character-based display (see step 1 in the workshop on the following page). As you proceed, behind the scenes the installation is setting up a working file

system that will end up contained in a single file, *suselive usr* that takes up about 100MB of your hard disk. On systems with less than 128MB of RAM the installation will also create a swap file, *suselive swp* for virtual memory – fully fledged Linux systems will normally use a dedicated partition for swapping, which tends to be more efficient, but using a file instead greatly simplifies the installation. A third file, *suselive 700* stores working data relevant to your particular installation.

pick up the route from our illustrated step-by-step guide on the following pages, which will talk you through to the point where you're running the default KDE desktop. SuSE has designed YAST2 to make the installation run smoothly, and because most of the data will stay on the CD you won't have to spend aeons waiting while your applications are copied across to the hard disk. I found the installation on my MaxData Artist unusually quick and smooth, including autodetection of the video card, network card and sound system. But of course it's always possible that something may go wrong. Please don't be discouraged – the chances are the problem is trivial. Read through the steps again, and look for additional information on the CD itself – it has text files that are readable from any operating system. If you're still stuck, email and tell me about it at unix@pcw.co.uk and I'll do whatever I can to get you up and running.

Once you've got through the installation you'll have a full working Linux system with some useful basic applications and a number of games. You can exit at any time by using the 'Logout'

At this point YAST2 (Yet Another Setup Tool, version 2) starts up in a low-resolution version of the X Window System, simplified to run on any modern display (see step 2 in the workshop). By now it should have detected your mouse – if not you can use cursor keys for the selections that follow, and there'll be a chance to pick your mouse at that point.

Now that the installation is under way you can



Step-by-step guide to installing SuSE



1 The opening character-based screen announces the OS version and carries the SuSE motto 'Have a lot of fun'. This gives way to a second character-based screen and a running console log of the boot sequence. Mysterious lines of information, like 'looking for braille display' will flash before your eyes. You can safely ignore these – the installation is carrying out a process of automatic hardware detection, which should all run smoothly on a modern standard PC.



2 Decide which language you want to use for the rest of the installation and the running system. A full explanation of what's happening is in the text window on the left-hand side. The para beginning 'Nothing will happen...' seems to be an exaggeration – the installation will now have written a couple of large files onto your hard disk to contain the working filesystem and the swap. But otherwise nothing is permanently changed and you can drop out at any time.



3 Next you need to select your keyboard type and supply information about your time zone. Getting the keyboard mapping right can be important – it's frustrating trying to control a machine that thinks that a forward slash is the same as a hash-mark. The installation will offer you its best guess, but you don't have to leave it to guesswork because SuSE provides a text area in this screen where you can test the keyboard settings before proceeding.



7 SuSE hasn't detected any printers or modems because I carry out those functions through my network. You can set up any of these features at this point, or wait until later. I used the opportunity to make sure my sound was working, and was rewarded with some soothing music.



8 Now is a good time to set up any network addresses if you're on a LAN. As with all these YAST2 screens, the scrollable text on the left is there to talk you through it. The screen that follows will quiz you about the addresses of nameservers – information normally supplied by your ISP.



9 This is what the KDE desktop looks like once you're up and running. Clicking on the 'Tour' link will take you the rest of the way. By default it's set up for four virtual screens (the buttons on the launch bar at the bottom), but you can add many more if you like. The large K button down in the left-hand corner pops up a menu of the most important programs; others are on the menu popped up by the Cogwheel to its immediate right.

pop-up on the main K icon, but note that this is only an exit from that particular login. The main Linux system is still running and won't thank you if you just switch off without closing it down gracefully. The correct procedure is to choose 'Shutdown' at the login menu, whereupon Linux will tidy up and bring down its various daemons one by one,

finishing off by writing out the latest system state to the `suslive.700` file. At this point it's OK to switch off or reboot.

If you reboot with the SuSE 7.0 CD it will recognise the presence of the various `suslive` files and instead of starting a fresh installation you'll be taken straight back into the system you created. If you boot without the CD-ROM you'll revert

to whatever you were running previously. To remove SuSE from your system completely (but I hope you won't), just use your existing operating system to delete the `suslive` files.

And that's basically all there is to it. There are tons of applications available for Linux these days, and this disc only gives you a first taste. You might want to



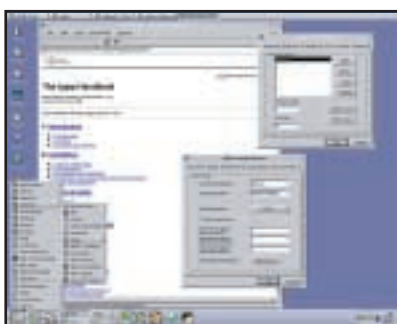
4 Now we get personal. Linux is a multi-user system, and even if you're not planning on sharing your system with others you still need to create a personal account and provide it with a password. This is because every system has at least two accounts – the one you'll be logging into for everyday use, and the super-user account, called root, which is used for administration.



5 The screen that follows lets you establish a password for the all-important root account. Whatever you do, don't forget this, or you won't be able to carry out any administration – all the configuration files in key directories like /etc are not changeable from an ordinary user account. This is why it's standard practice to logon as an ordinary user for most of the work you'll be doing. That way you don't run the risk of accidentally munging the system.



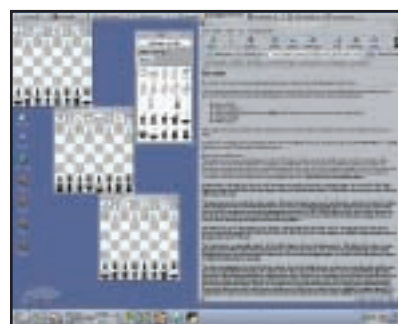
6 YAST2 should have auto-detected your video card, but it will need to be told what sort of monitor you have attached to it. My Hitachi CM802ET wasn't specified, but if you know the specs for the horizontal and vertical sync you can pick the nearest equivalent, or write in your own information. The screens that follow let you choose your resolution and make fine adjustments.



10 Probably the most important thing to set up now is your Internet connection. If you're using a dialup ISP the tool to help you with this is kppp. You can call it up by clicking on the large K button and picking Internet/kppp from the menu that pops up. Extensive help with kppp (The kppp Handbook) is available from the tool's own Help button.



11 You can bring up Netscape by clicking on the blue 'navigation wheel' icon on the left-hand side of the desktop. By default the home page is set to the local Apache web server, so as well as surfing the Internet, Netscape can also be used to access the cornucopia of information stored on the CD-ROM in the form of traditional Unix manual pages (man pages), GNU software info pages and general HOWTOs.



12 Now the installation's done and you've finished the configuration it's time to reward yourself with a game or two. You'll find 3D Chess under the SuSE/Games/Board menu which pops up from the main K button down in the bottom right. By the way, a number of other games mentioned in that menu aren't actually installed so open a terminal emulator (the shell-and-screen icon on the launch bar) and type `rpm -qai | less` to see what's available.

visit www.gnumeric.org/desktop/packages.php3 to see some of the other available applications (like the gnumeric spreadsheet) and www.gimp.org for a terrific Photoshop-style graphics application. And of course there's StarOffice from www.sun.com/staroffice.

But if you're going to download all this you'd probably be better off with

one of the official versions of SuSE 7.0, which include all this and more. Check out, for example, www.linuxemporium.co.uk, where John Winters is selling the official boxed versions. And if for some reason you haven't been able to create your own CD from our cover DVD John tells me he expects to have ready-made LiveEval CDs available for

two or three quid by the time you're reading this.

CONTACTS

Chris Bidmead welcomes your comments on the Unix column. Contact him via the PCW editorial office or email: unix@pcw.co.uk



Cookie grumbles

Tim Nott unravels the secret life of cookies and warns of falling prey to Direct Dial connections

I've pontificated at length in this column about password security, (December 1999) and generally try to follow my own advice – particularly that of not getting Windows to 'remember' passwords that need to be secure. I was rather taken aback, therefore, when I logged on to my online bank, and found the user name and password fields were automatically completed after typing the first few letters of the former.

Now, I was pretty sure I'd never ticked the 'do you want Windows to remember this password?' box and, indeed, the bank's log-in page warns customers not to do this. Still, we can all make mistakes, so I shut down the connection and had a little spring-clean.

PWLEDIT, the Windows password list editor, provides a convenient way of removing (but not reading) passwords stored in the PWL file, but it wasn't there. None of the cookies I had related to the bank's site – though I hadn't expected them to anyway.

So, next I deleted all the History and Temporary Internet files. Logged back on to the bank – and it was still obligingly filling in my details. At this point I decided to take the matter up with the bank, but the report facility on its (appallingly slow) website did not appear to work.

I then decided on another attack from my end. I deleted all cookies from the Cookies folder and the Temporary Internet files folder. I double-checked these again from File Manager. My system was now squeaky clean, it appeared, so I logged back on to the bank. Yup, it still filled in the name and password. By now, I was getting rather



Left: Possibly the last place you'd think of looking...

Below: ...but this is where to stop password storage

File Manager, you'll find a number of files named INDEX.DAT. Windows won't let you open these, but it will let you copy them elsewhere, and open the copies in a text editor. This, to say the least, can be a revealing experience, exposing all sorts of information that you thought had gone forever. In my case, however, the DAT files just included

entries for the links that come pre-installed with Windows/IE5.

Back I went to the bank. I couldn't believe this, but my user name and password were still appearing. As the last possible resort of a desperate man, I bit the bullet and looked in the IE5 help file. Searching under 'Autocomplete' produced the news that this feature not only stored web addresses, but also online forms and passwords. The former are cleared by clearing the History – but not, it seems, the latter. And guess what? The Autocomplete facility for forms and passwords is apparently turned on by default. So when you access a supposedly secure site, there's no warning from Microsoft, and no warning from the bank's web page that this will happen.

The help file reassures you that the information is stored in an encrypted form on your PC, but doesn't tell you where. It also mentions that you can select a suggestion that pops up when you fill in a form and delete it. If you want to delete all such entries then you need to go to the IE5 Tools, Options, Content tab (which is the last place I'd think of looking) and hit the Autocomplete button. There you will find controls to disable Autocomplete of forms and

annoyed, so I took the drastic step of restarting in MS-DOS mode, and using the DELTREE command to remove the History folder and all its spawn, and repeated this for the TEMPOR~1 folder. Note that you must be very, very careful using this command: do a DELTREE /? first to get an explanation of the syntax and options.

I then restarted Windows and found, as expected, that it had recreated the deleted folders. If you examine these in



passwords, and also clear existing entries. If your version of Internet Explorer doesn't have these options, you can achieve the same result with a bit of Registry editing. Go to HKEY_CURRENT_USER\Software\Microsoft\Internet Explorer\Main and set the string value of FormSuggest Passwords to no.

Cookie in the nest

If you read Nigel Whitfield's excellent 'Privacy on the Net' feature in August's *PCW*, you will be familiar with the concept of third-party cookies. If you missed the feature then, in a nutshell, these cookies are placed on your computer by banner adverts, which in turn are dished out from a server independent of the host page. Hence this server can read cookies it has placed during previous 'guest appearances', and build up a list of websites that you've visited.

Whether you find this invasive or just downright creepy, you can only prevent this by completely disabling cookies or asking for a prompt each time one is served up. If you choose the former, then you can lose a lot of functionality – websites won't remember your preferences and you may have to go through elaborate sign-in procedures on often-visited sites. If you choose the latter, then you'll be spending a large part of your surfing day responding to the prompts – and believe me, there are a lot of these. Also the bit that states 'This file can only be used by this website' is misleading: third-party cookies sail through.

Some advertising companies will let you opt out of receiving their third-party cookies – check out www.doubleclick.net/company_info/about_doubleclick/privacy/privacy2.htm – but, of course, you would have to do this for every advertising or tracking company. Even if they all allow this, it would be a major task.

So, good news from Microsoft, which is currently beta-testing an update for Internet Explorer that will differentiate between standard and third-party cookies in order to give the option of refusing the latter automatically. The

update will also make it easier to delete cookies that are already on your hard disk from their various hiding places.

Geeks bearing gifs

And now the bad news. In September's column I mentioned ad-supported software that transmits data back from your PC to the advert provider without your knowledge, and how to get rid of this using Steve Gibson's OptOut. Since then, new strains of snooping software have been detected.

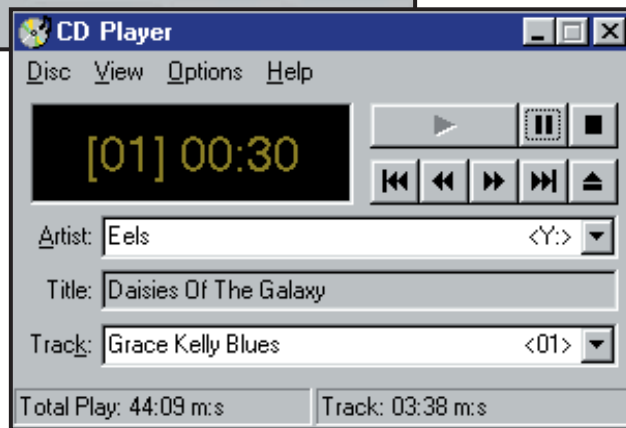
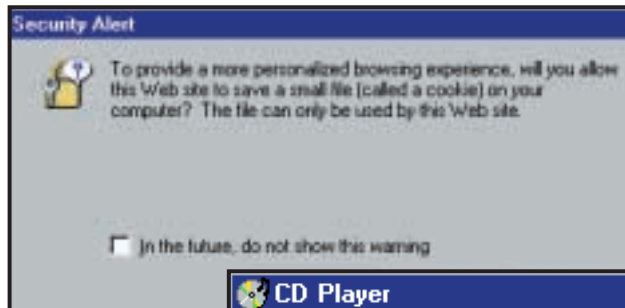
First come web bugs. These are tiny gif images – too small to see on a web page – that can be used to collect information about you and return it to a

regarding this, and RealNetworks has also been accused of its RealDownload software being 'spyware', as has NetZip's Download Demon. All three programs share a common ancestry, and Steve Gibson has, once again, been on the case.

RealNetworks initially denied the allegation, but later admitted that the capability was a 'flaw' that the company was unaware of – and therefore was not using. Nevertheless, with 'packet sniffer' software, Steve found that both his name and his email address had been transmitted, apparently because of a cookie placed on his PC when he bought other software from RealNetworks earlier. Although Steve now accepts RealNetworks' statement of good faith, the whole story makes for a gripping read on <http://grc.com/downloaders.htm>.

You've been DUN

Since I'm in the mood for scary stories, consider the following, which happened to that legendary figure in PC folklore, a friend of a friend. This person found that he had acquired a new DUN icon called 'Direct Dialler', which showed 555 555 5555 as the dialling number. However it showed a premium-rate number (0909) in the User Name field, and when clicked, dialled the latter, clocking up a £200 phone bill in a day. Allegedly, I have to admit; I stuck this in the Urban Myths folder for a while,



Top: Internet Explorer doesn't detect 'third-party' cookies, but it will soon

Bottom: Business as usual – getting CD player working again

web server. Apparently web bugs can also be used in email, to return an email address and the time the mail was read. Again, the prevention is to turn off cookies in your web browser, and use a plain text mail reader. For the full dirt, check out Richard Smith's Web Bug FAQ at www.tiac.net/users/smiths/privacy/wbfaq.htm.

Another new threat is download-enhancing software that keeps track of files you have downloaded from the Internet, and transmits this information back. Netscape/AOL's SmartDownload has been the subject of legal action

until curiosity got the better of me. After a bit of web searching I found www.loadsadosh.com/directconnect/main.htm, home of Direct Dial.

This little shrine on the slopes of Mount Greedy really has to be seen to be believed: it offers your 'customers' direct access to your website via premium-rate numbers all over the world for a once-only setup charge. So, for example, a 15-minute browse or download will cost your 'customer' £10, of which you get to keep £6. And the worse the connection, the more they pay. Oh, and there's a nice little pyramid-selling twist as well. So

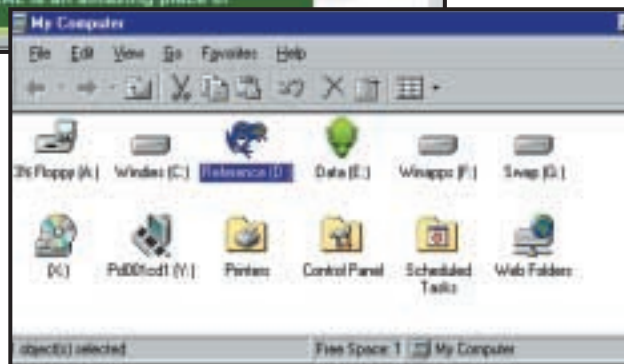
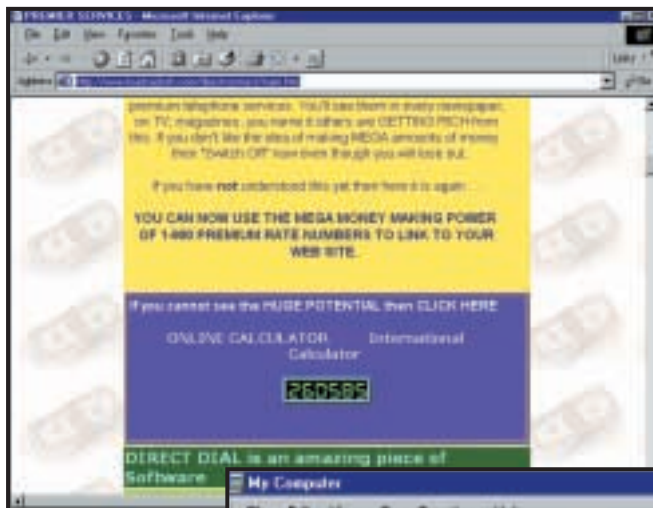
keep a very close eye on your DUN folder, and don't get duped into downloading a Direct Dial connection.

DUN for

While we are on the subject, a frequently-asked question on the dial-up networking front concerns backing up the settings for a connection.

Although the DUN folder appears to contain a separate file for each connection, neither the folder nor the files exist in real life: that is to say you can't see them in DOS or in File Manager.

In fact, these icons relate to settings that appear in diverse branches of the Registry. Furthermore, there's no right-click copy function, and copying from the Edit menu does not appear to do anything. What does work, however, is good old drag-and-drop, albeit in a rather strange way. Drag a DUN entry into another folder (or the desktop)



Top: They're getting rich quick – via your phone bill

Bottom: A little annoyance – My Computer covers up Free space

the file (see figure 1). Just save it as text only with a '.reg' file extension. To make the change just double click on the file.

Over to you...

I've had several queries on a minor irritation: when you open 'My Computer' the default large icon view shows a panel displaying 'My Computer' in the status bar. This seems to serve no purpose at all, but obscures the Free space and Capacity information to the left of it. Although you can see this information for all

drives by going to details view, there seems no way of getting rid of, or resizing the annoying 'My Computer' panel, short of stretching the entire folder window. I'm stumped on this one, so if anyone has any ideas on getting rid of this – or even offering a plausible reason for its existence –

FIG 1

Default Audio CD Registry settings

REGEDIT4

```
[HKEY_CLASSES_ROOT\AudioCD]
@="AudioCD"
"EditFlags"=hex:02,00,00,00
```

```
[HKEY_CLASSES_ROOT\AudioCD\DefaultIcon]
@="C:\WINDOWS\SYSTEM\shell32.dll,40"
```

```
[HKEY_CLASSES_ROOT\AudioCD\shell]
@="play"
```

```
[HKEY_CLASSES_ROOT\AudioCD\shell\play]
@="&Play"
```

```
[HKEY_CLASSES_ROOT\AudioCD\shell\play\command]
@="C:\WINDOWS\cdplayer.exe /play %1"
```

(Key: ✓ code string continues)

and you'll get a (real) file with the .dun extension.

This is actually a plain text file and can be loaded into Notepad. It contains all the information about the connection with the exception of your user name and password, which for obvious security reasons you should keep elsewhere. When dragged back into the DUN folder it magics itself back into the requisite Registry entries.

More sound advice

Back in September, I urged you all to make a backup of the Registry AudioCD settings, so that in the likely event of an alternative music player messing your settings, you could restore the defaults so that audio CDs once again autoplplayed with the Windows CD player.

Sound advice indeed, but not much comfort for those, such as Mike Keow, who had already installed MusicMatch Jukebox. Despite a long and vigorous exchange of views with the MusicMatch support team, Mike was unable to get the original CD player working properly. So for those, like Mike, who don't have a backup made, I've included the text of

please share them. Your place in the *Hands On* hall of fame awaits you.

Finally, I'm sorry that this month's column seems to be largely doom and gloom, but never has the adage 'forewarned is forearmed' been more true. So just to cheer us all up, here's another challenge. What has Linux got that Windows hasn't got? I'm not talking about open-source architecture or anything remotely technical, but that superb marketing aid, the penguin.

Now, given the stick that big bad Microsoft has been getting recently, both in the US and Europe, is not our favourite operating system crying out for a cute and cuddly mascot? How better to win back the hearts and minds of the great computing public. So suggestions, please, to win@pcw.co.uk.

CONTACTS

Tim Nott welcomes your comments on the Windows column. Contact him via the PCW editorial office or email: win@pcw.co.uk. Please do not send unsolicited file attachments.



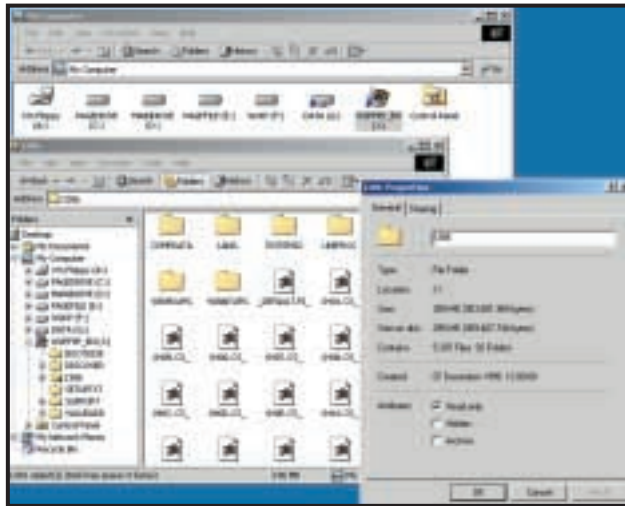
Upwards and onwards

Upgrading under Windows 2000 isn't as straightforward as it seems, says Terence Green

There must be plenty of people facing a similar situation as Allan Toombs. He is thinking about upgrading to a new motherboard and has read earlier columns about Advanced Configuration and Power Interface (ACPI) where I recommended a complete upgrade install if ACPI is enabled after Windows 2000 has been installed.

If Windows 2000 has been installed without ACPI enabled, then the upgrade route is the only way to ensure that Windows 2000 detects ACPI and sets itself up correctly. Alan wondered whether a motherboard swap would also need an upgrade install or if he could simply replace the motherboard and allow Windows 2000 to 'notice the changes'.

In theory this is exactly what should happen. Windows 2000 is pretty good at detecting and setting up hardware that it knows about, ie is on the supported list. But you have to have the hard disk properly configured and, even then, power management can throw a spanner



in the works. Go into the PC BIOS and check the settings for the hard disk and ACPI before attempting to boot Windows 2000. Check the CD-ROM drive, too, because you'll probably need it during the process.

The hard drive with Windows 2000 should be attached and configured as the boot drive in the PC BIOS (and in the SCSI adaptor configuration, if it is a SCSI

If you have 300MB of spare disk space you can copy the Windows 2000 install files to a local drive

drive). In most cases it will be OK to set the hard drive to AUTO in the PC BIOS, even if it was previously manually configured (with cylinder, heads, sectors). If it wasn't on AUTO

on the previous motherboard's BIOS, make a note of the settings, as you may need them. With the hard disk set to AUTO try booting up. If you see the Windows 2000 boot menu you're in luck. If not, go back into the BIOS and ensure that the settings are identical to those in the BIOS of the replaced motherboard.

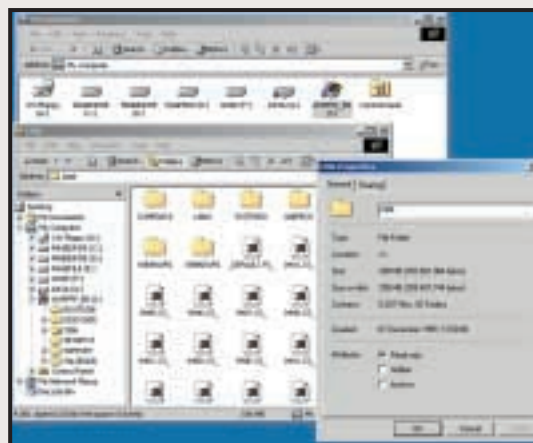
The next problem area is that your old PC may have had ACPI enabled in the BIOS and the new motherboard may have arrived with ACPI disabled by default, or vice versa. The ACPI setting in the PC BIOS of the new motherboard must be configured in exactly the same way as the motherboard being replaced. If it isn't, the chances are that Windows 2000 will not work properly at all. It may boot (complaining bitterly) or it may simply freeze at the 'Starting Windows' screen. You have to be careful here. Don't assume that it has hung if it waits for a long time because this is where hardware detection happens and the new motherboard may be giving Windows 2000 pause for thought. If you can reboot with Ctrl & Alt & Del the system probably wasn't frozen. Allow it to reboot and have a bit more patience second time around!

If it has frozen and the problem isn't power management, you have a hardware conflict or a piece of errant hardware not on the Hardware Compatibility List. It may be possible to resolve the problem by disabling potential troublemakers such as

Service Pack 1 arrives

Service Pack 1 for Windows 2000 slipped out on 1 August. This is a little later than expected and it arrived too late for me to have a chance to try it and give you the low-down in this column. My best advice is not to apply it unless you know it will fix a problem you have.

The full list of bugs fixed in SP1 is posted on the Microsoft site, linked from the following KnowledgeBase article: <http://support.microsoft.com/support/kb/articles/Q260/9/10.asp>. If you decide to



Service Pack 1 is out at last and here's the list of bugs it fixes. Don't install it unless you need it

apply SP1, it's a good idea to have a recent backup of your system and data and

to allow SP1 to back up any files it replaces – just in case.

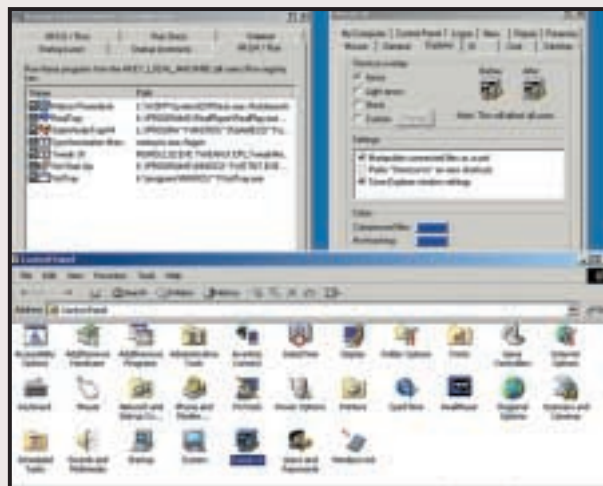
Pulling out the arrows

Steve Turner wrote to me to ask if there is a way of removing the arrows from shortcuts, as there is with TweakUI and Windows 98. He also wants to remove unwanted startup programs from the system tray.

If there is no obvious way of disabling a system tray icon on its Properties pages, Startup Control Panel from Mike Lin at www.mlin.net seems to work OK. Or, if you have it available, you can use the Windows 98 msconfig.exe (located in the SYSTEM

subdirectory of Windows 98). If you do use msconfig.exe, there are several error screens to click through, but it seems to work well otherwise.

Lastly, you can use TweakUI, an unsupported Microsoft utility under Windows 2000. There is no official release of TweakUI for Windows 2000 yet. But most recent versions for Windows (98 or NT – there are lots) work. Get it from the Windows 98 CD or do a search with Google.com for a source on the Internet.



Using Mike Lin's Startup Control Panel or TweakUI to manage startup tasks and shortcut cosmetics

USB, infra-red, or serial ports in the BIOS. If that doesn't work, it's time to start removing peripherals one by one until the system boots. Remove non-essential and external devices first, working towards a bare minimum of hard disk, display adaptor, floppy drive, CD-ROM.

If necessary you can remove the CD-ROM as well, but before you do that,

copy the Windows 2000 install files onto the local hard disk. You may need a boot disk for this – the Windows 98 Startup Diskette with CD-ROM support does nicely. Copy the entire I386 folder from the Windows 2000 CD to the hard disk. After doing this you can run winnt.exe from this folder to install Windows 2000. If your Windows 2000 system only has NTFS drives and refuses to boot you're entering Recovery Console country. There isn't room to go through the whole procedure here, but it is detailed in Windows 2000 documentation.

That's the bad news! The good news is that if you prepare carefully and the system is properly configured, Windows



An upgrade install will preserve all your application and configuration settings

2000 will boot to the login screen. Once you log in (use the administrator login the first time) you may be confronted with numerous hardware detection screens and requests for driver locations. Hopefully, your CD-ROM is working, as you will almost certainly need to feed the Windows 2000 CD into it. If the CD isn't working you can try copying the Windows 2000 install files onto the local hard disk using the method outlined above, but there shouldn't be a problem with new, properly configured, SCSI or ATAPI CD-ROM drives.

My gut feeling is that if detection works (it may take a few reboots for all the devices to be detected) and the

system feels right, this is good enough. If, however, there are ongoing problems, I would consider opting for an upgrade install at this point. This retains all your existing configuration settings and installed applications.

A backup of your system is handy in case things go awry, but you should have taken care of this anyway before making such a big change as a motherboard swap. An upgrade install does take about an hour or so but guarantees (we hope!) complete detection from scratch, instead of relying on Windows 2000 to figure out the differences between the old and new system hardware.

An upgrade install can be started in any number of ways. If you can get to the Windows 2000 desktop you can start an upgrade install from there. Insert the Windows 2000 CD. If the installation doesn't autostart, double-click the CD icon in My Computer to start the Windows 2000 Setup Wizard. Choose the 'Upgrade to Windows 2000' option and follow the prompts. Alternatively, you can boot with the Windows 2000 CD or with Windows 2000 floppy boot disks. Or, if the CD is inaccessible under Windows 2000, copy the Windows 2000 install files to the local hard disk.

CONTACTS

Terence Green welcomes your comments on the Windows 2000 column. Contact him via the PCW editorial office or email: win2000@pcw.co.uk



The strange world of IRQ

Roger Gann takes a good look at IRQs – what they do, what can go wrong and how to fix them

I first seriously started using Windows NT with the release of version 3.51, and noticed the absence of two COM ports, COM 3 and 4. For several years I'd been used to four COM ports, under MS-DOS and then under Windows 3.x. This was an early form of IRQ 'sharing', as the four COM ports shared two Interrupt Requests (IRQs) – COM 1 and 3 had IRQ 4 and COM 2 and 4 had IRQ 3. This arrangement depended on the two COM ports that shared an IRQ never accessing it simultaneously. So, if your mouse was on COM 1, your modem had to be on COM 2 or 4.

This cosy arrangement came to an abrupt end with the advent of Windows NT. I remember going to an early press briefing sometime in the last century on Windows NT, given by Microsoft's then VP Paul Maritz. He told a roomful of bemused hacks that 'there's no partying on the hardware with Windows NT'. This geek-speak soon manifested itself in my eyes as an early bath for COM ports 3 and 4, which simply vanished from the device list. For them the party was over under the new, serious operating system.

One way round this was to give the COM ports their own private IRQ, but this brings us up against a more serious problem – the general scarcity of IRQs. PCs usually have 16 interrupt lines. System resources occupy many of the IRQs. When you buy a PC, system resources will typically be assigned to the IRQs as shown in figure 1. As you can see, a lightly specified PC might only have a couple of spare IRQs. This problem is neatly overcome by Windows 98, which supports IRQ Steering, allowing PCI devices to share the same IRQ – my PC has 23 devices sitting on 16 IRQs. Sadly such niceties, along with Plug and Play, are conspicuous by their absence in NT4.

PCI/IRQ troubleshooting

Windows NT expects all devices to be configured correctly before it starts so that it can load the appropriate driver for each device. Windows NT doesn't utilise the Plug-and-Play specification; therefore it cannot dynamically reassign an IRQ.

In NT4, the BIOS assigns IRQs to PCI

Right: Spot the missing COM ports – under Windows 3.1x, there used to be four listed in this dialog box!

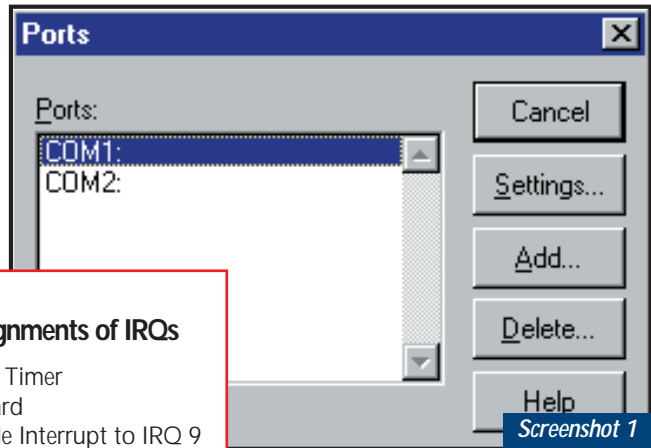


FIG 1

Typical assignments of IRQs

- IRQ 0 System Timer
- IRQ 1 Keyboard
- IRQ 2 Cascade Interrupt to IRQ 9
- IRQ 3 COM 2
- IRQ 4 COM 1
- IRQ 5 Available (Typically LPT2)
- IRQ 6 Floppy Disk Controller
- IRQ 7 LPT 1
- IRQ 8 Real Time Clock
- IRQ 9 Cascade to IRQ 2
- IRQ 10 Available
- IRQ 11 Available
- IRQ 12 PS/2 Mouse
- IRQ 13 Math Co-processor
- IRQ 14 Hard Disk
- IRQ 15 CD-ROM

devices. If possible, set the BIOS PnP-aware OS setting to 'NO' – this makes the BIOS allocate I/O resources to all PCI devices. When sorting out a system with IRQ troubles, first give each non-PnP ISA device (legacy devices) its own unique IRQ. In the system's CMOS setup, mark these IRQs as 'not available' to the PnP system. The remaining IRQs will be distributed between the PnP devices (PCI, PnPISA, EISA, MCA, etc). Try to get the BIOS to give each PnP card its own unique IRQ.

If some hardware you have just installed is ill-behaved, click the Start button, point to Programs, point to Administrative Tools, click Windows NT Diagnostics, click the Resources tab and then click IRQ. If all PCI devices in question appear with their own separate IRQs, but your system shows them as sharing an IRQ, the problem is most likely system-related, so check for a BIOS upgrade. Install the last PCI device that failed, but do not install its driver.

If the computer fails, it is most likely a

hardware issue that should be resolved with the manufacturer. If possible, remove all PCI devices and install them in the reverse order to see if IRQ-sharing performs better. You can try changing the slots where the cards are installed, too. Altitech has a useful PCI-scanning utility that you can download for free and will give you low-level information on your PCI setup (see screenshot 2, opposite).

Each PCI device has four interrupt lines, known as INTA to INTD. This means that each device can generate up to four different types of interrupts. Normally only INTA is used. The BIOS controls the boot-time mappings of INTs to IRQs, and it can do this on a slot-by-slot basis. Thus slot 1's INTA might be mapped to IRQ 9, but slot 2's INTA to IRQ 11, yet a motherboard PCI device can be using INTD at IRQ 11 at the same time, too! This is also why moving cards to different slots causes the assigned IRQs to change and why re-ordering the cards in the slots can sometimes (chiefly by fluke!) appear to fix problems.

Try the BIOS 'Reset Configuration Data' function – sometimes the BIOS gets confused, especially if you change cards a lot, and this is the only way to 'wipe the slate'. This data is the 'ESCD' and/or 'DMI' data you often see referred to at boot time. A hang when 'verifying' this data usually indicates that it needs to be cleared using these techniques.

NT QUIRQs

You may have come across one or two of these IRQ gotchas. First in the IRQ queue is

IRQ 7. Some NT4 (and Windows 2000) users have noticed the absence of IRQ 7 from the listing generated by WinMSD (see screenshot 3). IRQ 7, in case you didn't know, is traditionally associated with LPT1, the parallel port. For years we had to be mindful of interrupts and I/O addresses. Windows NT and 2000 do not use IRQ 7 for the printer port and hence do not list it in their configuration tools.

According to Microsoft, the printer port does not use any Interrupt Request lines. Instead, both NT and 2000 use a thread-based port driver. This has two benefits over the Windows 9x and DOS platforms. First, it reduces the number of potential conflicts for hardware devices trying to use IRQs 5 and 7 (printer ports 2 and 1 respectively). Second, it allows the operating system to control the priority of the print job thread, thus improving application performance by reducing the thread priority of the port print function. It also frees up two IRQs for other devices.

Because the Windows NT parallel-port driver is thread-based, the port is polled at 'background priority'. If you have applications that run slowly due to large print jobs, you can reduce the thread priority of the port print function by adding a Registry entry. Start the Registry Editor (Regedit32.exe), and locate the following key: HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control\Print.

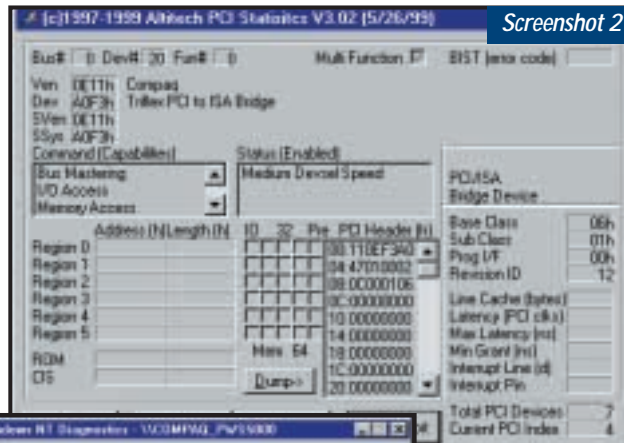
Add or change the following value:

Key: PortThreadPriority
Type: REG_DWORD
Value: -1

Quit the Registry Editor. The default value in NT4 for PortThreadPriority is 0, which equals THREAD_PRIORITY

_NORMAL. The value for THREAD_PRIORITY_ABOVE_NORMAL is 1 and THREAD_PRIORITY_BELOW_NORMAL is -1.

Another gotcha is that there's no easy way to set up a PC Card's IRQ under NT. You must edit the Registry and enter an 'IRQ mask'. Fire up RegEdit and edit: HKEY_LOCAL_MACHINE\System\CurrentControlSet\Services\Pcmcia Add Value name InterruptMask of type REG_DWORD and set the RADIX to Binary. Enter the 16-digit mask.



If you want low-level info on the PCI hardware in your PC, check out Altitech's free PCI scanner utility, AltIPCI – download it from www.altitech.com – it's specifically for NT (and Windows 2000)



The useful NT diagnostics tool, WinMSD, details a lot of nitty gritty info about your Windows NT machine. Here, spot the absence of IRQ 7

The 'Interrupt Mask' is composed of a series of binary switches, 0 means the IRQ is available and 1 means the IRQ is unavailable. An example for allowing IRQs 10, 9, and 3 is shown in Figure 2.

When you click OK, the mask would

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
1	1	1	1	1	0	0	1	1	1	1	1	0	1	1	1

Figure 2: In this Interrupt Mask, you can see that IRQs 10, 9 and 3 have been made available by setting the binary switch to 0

appear as f9f7 in the right-hand pane of RegEdit. Exit RegEdit and reboot.

Following on from last month's column, where I described upgrading to a multiprocessor system, there are possible IRQ problems here. When you run Windows NT Diagnostics, Winmsd.exe, on a computer that adheres to Intel MultiProcessor Specification (MPS) v1.4, the IRQ displayed for PCI devices may be incorrect. The problem occurs because Winmsd.exe displays IRQ information directly from the MPS

interrupt table and the MPS v1.4 specification changes the format of PCI devices in the MPS interrupt table to improve support for multiple PCI bus PCs.

To troubleshoot possible IRQ conflicts on an MPS v1.4-based computer using Winmsd.exe, you must use the uniprocessor HAL. To temporarily use the uniprocessor HAL and kernel files follow these steps:

First, copy Hal.dll and Ntoskrnl.exe from the CD or expanded Service Pack (SPfileName.exe /x) to the %TEMP% folder.

Second, rename %TEMP%\Hal.dll as %TEMP%\UniHal.dll. Rename %TEMP%\Ntoskrnl.exe as %TEMP%\UniKrn.exe. Move %TEMP%\UniHal.dll to %Windir%\System32\UniHal.dll. Move %TEMP%\UniKrn.exe to %Windir%\System32\UniKrn.exe. Then make BOOT.INI accessible with:

```
Attrib -r -s -h c:\Boot.ini
```

Third, edit c:\boot.ini and add another entry, which is the same as your default, except it should look like:

```
multi(0)disk ....\WINNT40 ✓
="Windows NT Version 4.00 - ✓
UNIHAL" /hal=unihal.dll ✓
/kernel=unikrn.exe ....
```

(Key: ✓ code string continues)

Fourth, save c:\boot.ini.

Lastly, input:

```
Attrib +r +s +h c:\Boot.ini
```

When you need to get an accurate IRQ listing, boot to the UNIHAL entry and run Winmsd.exe.

CONTACTS

Roger Gann welcomes your comments on the Windows NT column. Contact him via the PCW editorial office or email nt@pcw.co.uk



Inside XFce

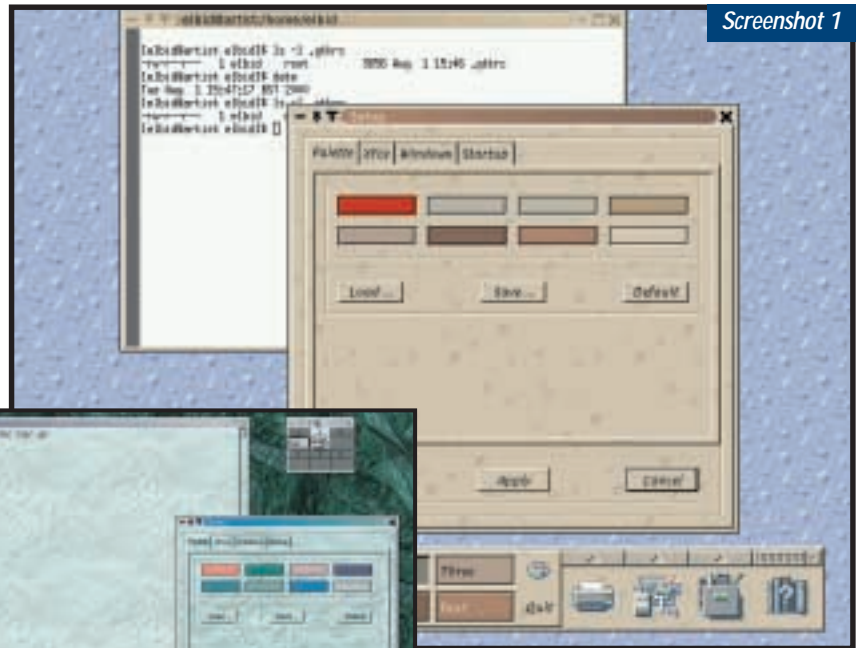
Chris Bidmead takes a deeper look at XFce and finds an even more lightweight windows manager

The Unix-inspired simplicity of XFce dictates that all its characteristics are defined by a set of editable text files. As we discovered last month, the main default definitions can be found in `/usr/share/xfce`. Let's take a closer look.

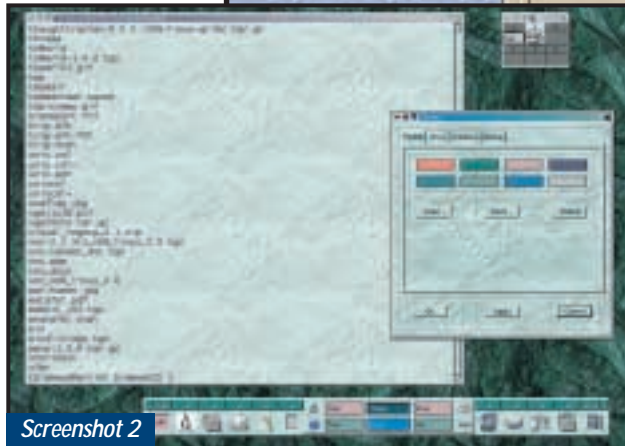
The directory contains five subdirectories called backdrops, help, icons, palettes, sounds and textures. The icons and backdrops directories turn out to be full of xpm files. The initials stand for 'X pixmap', which is a standard X format for colour images – principally icons. The lightest compiled versions of XFce require images in this format, but you can also compile (as I did) a fatter version that includes the `Imlib` image library, which then allows XFce to munch on a much wider range of image formats.

The palettes directory contains text files whose names correspond to the palette options available from the Palette tab in the XFce setup dialog. As we discovered with the `/etc/X11/gdm/Sessions` directory last month, you simply have to add a file to the directory for it to appear as an option in the GUI selector.

While we're on that subject, I had a nasty moment after I'd sent in my column last month. For some reason I had to reboot the Mandrake 7.0 system on my Artist workstation (a rare event, this) and, on returning to the Gnome `gdm` login, I discovered that my new XFce session had completely disappeared from the menu. I began to fear that everything I'd told you last month about the way this works might be rubbish (it's difficult – and sometimes impossible – to track down definitive documentation on some of this stuff, so I tend to make a lot of it



Screenshot 1



Screenshot 2

Here I've made my own texture file and incorporated it in a palette file to give a 'Unix Column' look to XFce

A cheesy view of XFce. The texture is defined by the file `cheese.xpm` in XFce's `../textures` directory

up as I go along! Checking empirically step by step, of course).

To make matters worse, the `/etc/X11/gdm/Sessions/XFce` file was still in place, so I couldn't figure out why it wasn't being recognised. And then I noticed that it had had its executable flag stripped. When I restored the flag (chmod `a+x XFce`) and restarted X, XFce reappeared on the `gdm` greeter menu. However, on rebooting – lo, the executable flag had been munged again, and XFce once more vanished from the options.

A likely suspect (and, as it proved, the culprit) was `/etc/rc.d/init.d/mandrake_evertime`, a special Mandrake SysVinit startup script that, as its name implies, runs every time you reboot the system. In my humble opinion, this is philosophically dubious. In times past it was fairly

standard practice to run special scripts at boot time that handled administration tasks such as clearing out the `/tmp` files. The problem is, you never know when – if ever – the user is going to reboot the system.

SysVinit startup scripts should be about bringing the system to a specific state (per runlevel), not about carrying out one-off tasks. So a SysVinit script that loads the appropriate daemon for running, say, a cryptographic file system, is doing the right thing. But clearing out `/tmp` files, or – as in the present case – massaging the `gdm` greeter options back to some factory default by deactivating files it doesn't know about, is best avoided. In the case of `/tmp` files, the modern practice is to clean them from a cron script.

The `mandrake_evertime` script carries out a rat-bag of fixes, such as building a `/etc/resolv.conf` file if there isn't one in place and creating mount directories for the floppy drive and CD-ROM if they've got munged. This must be designed to fit the expectations

of the typical Windows user, for whom the solution to any screw up is to reboot the system. I can see that if, for some reason, the gdm greeter options have gone AWOL, it would be useful for the beginner to be able to restore them with a reboot. But if you've carefully crafted your own options, it's infuriating to have an arbitrary boot-time script ride roughshod over them. It'd be much better, in my opinion, if this function were in a script called something like `/usr/local/sbin/restore-defaults`, with appropriate documentation.

But to get back on topic... A typical file in the XFce palettes directory looks like this:

```
[root@artist palettes]# ✓
cat Cheese
192 0 0
194 185 170
197 189 174
189 166 134
185 167 151
139 110 94
183 142 111
219 205 177
-b&h-lucida-medium-i-normal ✓
-*-12-*-*-*p-*-iso8859-1
textures/cheese.xpm
```

(Key: ✓ code string continues)

The eight rows of numbers are evidently RGB colour values corresponding to the eight colours defined in the palette called Cheese (see screenshot 1, opposite), and the font is the system font used in XFce menus and titles. The textures entry at the end is apparently optional: it defines a texture

A window manager so ultra-lightweight it makes XFce look like a bus-load of Frank Brunos

map to use in XFce's screen furniture, pointing to an xpm file in the adjacent textures directory.

Knowing this, it became very simple to create the 'Unix Column' texture for incorporation into all my XFce screen furniture (shown in screenshot 2, opposite). Actually, the changes you make to files in the `../palette` and `../textures` directories aren't immediately read by XFce. When you change the palette, XFce uses the information to rewrite your local `~/.gtkrc` file, the resource file that defines the look of widgets (such as XFce's Main Panel and

the Setup dialog box) built using the GTK+ toolkit (full details are at www.gtk.org). You'll notice a similar texture behind the gnome-terminal in the screenshot, but this is a separate deal, achieved by configuring gnome-terminal itself.

A lighter side

Of course, adding texture to the screen furniture (to say nothing of compiling in the Imlib capability) detracts somewhat from the original point about XFce being a low-resource desktop. But since last month, I've discovered a new window manager so ultra-lightweight that it makes XFce look like a bus-load of Frank Brunos.

Larswm is a spartan, unglamorous and initially completely baffling window manager built on the premise that '...managing windows is the window manager's job!' In much the same way that so-called 'word processors' do precious little in the way of actually processing words (they just help you create them and move them around), Larswm's creator, Lars Bernhardsson,

has noticed that window managers typically don't do an awful lot to manage windows.

In the case of the Microsoft product named after them, windows aren't too much of a problem – you typically have a single fixed-size screen in which a number of windows get popped up and maximised or minimised. But with X you have a whole raft of different methods of handling windows on multiple screens across the network. If you're anything like me, then you've probably grasped the opportunity to create 'virtual real estate' in the form



Discover Windows 98 right on your Linux desktop! Lin4Win seems to do a good job of running Windows applications inside Linux, although I haven't tested it extensively. Trial copies can be downloaded from <http://www.trelos.com> – and you'll also need a legitimate copy of Windows

of multiple desktops, with windows littered everywhere in no particular order.

Even a 'lightweight' GUI handler, such as XFce, still allows a windows population explosion, with up to 10 different desktops, and windows that can be zipped up and down like rollerblinds as well as zoomed to full screen size or reduced down to icons. Even under XFce's disciplined regime I end up with dozens of windows, and spend a significant amount of time fishing about for the one I want. I really like having all those windows, but what I need is a more efficient way of managing them.

Larswm is a subtle window manager that has really taught me the meaning of minimalism. Lars has developed it as his own elegant extension of an earlier window manager called 9wm. In fact, 9wm derives in turn from yet another simple window manager called 8-1/2wm, which is the one especially designed to work with the Plan 9 operating system.

A key feature of this family of window managers is their stark appearance. No space is wasted with title bars, and there are no fancy launchpads or other desktop distractions. When a window is iconised it simply vanishes. Larswm takes all this a step further: although there are facilities for resizing windows and shifting them around the screen, the idea is not to bother with any of this, and instead to rely on the built-in autotiling machinery.



This is an alarming feature when you first encounter it – it might even strike you as a horrible bug. How do you handle windows where there's no title bar to get hold of? Well, you can click on a window to shift focus, but when you do that, the window shoots across the screen and opens up somewhere else. Is this guy Lars crazy?

Far from it. If you're prepared to be open-minded about this and take some time to figure out what's actually going on, you realise you have in your hands a powerful solution to the windows problem. The number one auto-tiling rule is very simple – there's one working window over on the left-hand side of the screen. The right side of the screen is occupied by tiles representing the currently inactive windows.

Rule number two is that windows don't hide other windows (which is why it's called tiling). It's not easy to convey the sheer delight that dawns on you as you persevere with this rather odd way of working. In the most basic method of using auto-tiling, this means that if a window isn't visible on the screen, it isn't there. Simple. But there are several steps a power user can go beyond this. Firstly, as I've said, you can 'iconise' a window in the conventional way – except that the icon is invisible. So the window has gone, until you recall it from the mouse menu, or use a key-combination equivalent.

Alternatively – once you get into this – the window might be open, but on another desktop. You can have as many as 32 different desktops (if you're desperate for more than this you can

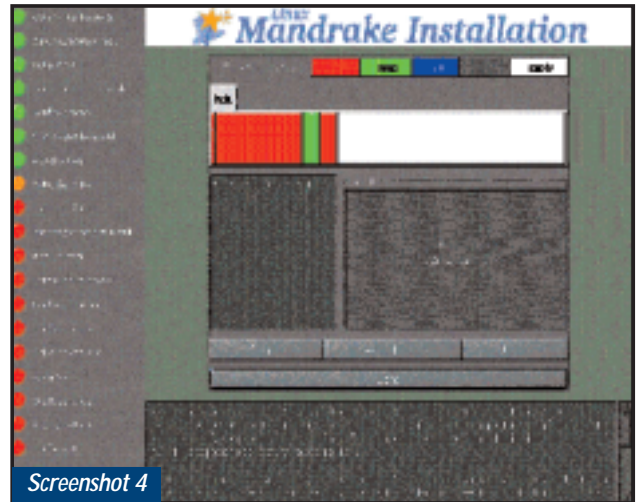
tweak the source code). There are several ways of moving between desktops – the easiest is probably by rotating the mousewheel, if you have one (see screenshot 3).

Lars Bernhardsson emphasises that Larswm has only been developed for 'research purposes', but I've found it extraordinarily usable. One trick is to run it as an application inside a more familiar window manager. Here Larswm is an Xnest session inside an XFce window evoked something like this:

```
Xnest :1 -full -name Lars ✓
-geometry 1272x1000 &
sleep 2 # let ✓
Xnest snuggle down
larswm -display :1 # ✓
Launch larswm into Xnest
```

The main screen here is Netscape, with ThoughtTracker, Emacs and an Xterm waiting in the wings.

Should you want to delve into this further check out www.fnurt.net/larswm, where Bernhardsson is developing his new toy at a frightening rate – so fast, in fact, that parts of what I've written so far are already out of date.



Screenshot 4

Mandrake's graphical installation process is intended to be beginner-friendly, but flexible enough for experienced users to mould to their needs

Mandrake

Last month I promised that I'd be reporting on Mandrake 7.1 as soon as Michael Breeze of Interactive Ideas was able to send me a copy. Until recently, Interactive Ideas was the UK distributor of Mandrake Linux, but as I mentioned last month, distribution is now in the sometimes less-than-deft hands of the enormous Pearson publishing empire, through its subsidiary Macmillan.

I have had a number of amusing telephonic interludes while I tried to track down anyone in Macmillan who knew what Mandrake Linux was. I finally ended up outside Macmillan again, talking to Adam Liptrot, the clued-up Internet manager of the PC BookShop in Sicilian Avenue in Holborn, London. Adam whisked Linux Mandrake 7.1 DeLuxe Edition off to me the same day. Thanks.

I haven't had an opportunity to install it yet, but I'm certainly looking forward to the 'fast, customisable graphical installation process' (see screenshot 4) and the bonanza of additional software on the seven CD set. There will be more of this next month. In the meantime, you can track down this latest version of Mandrake at www.pcbooks.co.uk, priced at £60.99 for the Deluxe Edition and at £31.99 for the Standard Edition.



Screenshot 3

This is Larswm in action. You can just make out the title bars at the bottom of each window – black for active and white for inactive

You may notice from the windows in screenshot 3 that Larswm now features optional titlebars (the strips under the windows, black for the focused window, white for the others). He's also recently added a rather cunning way of handling auto-tiling applications, such as Gimp, by assigning them to non-autotiling 'sub-desktops'.

CONTACTS

Chris Bidmead welcomes your comments on the Unix column. Contact him via the PCW editorial office or email: unix@pcw.co.uk



Trouble with doubles

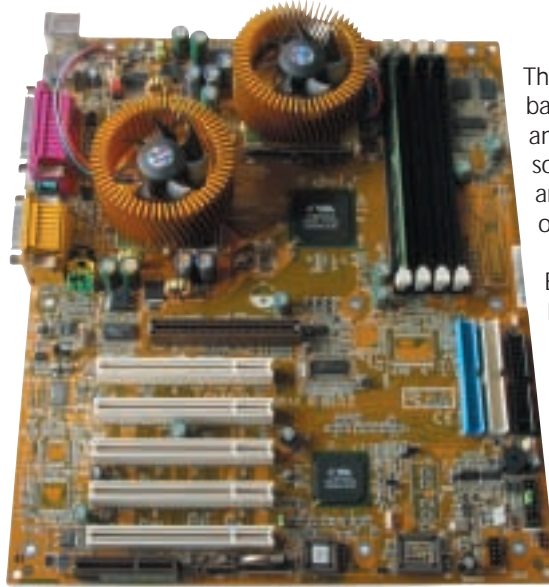
When the chips are down with the latest dual-CPU boards, Gordon Laing turns to the BP6

Maybe it's divine intervention, or perhaps a warning from the great god of CPU health and safety. Either way, while testing a bunch of CPUs and motherboards to their limits for this month's column, my oven grill exploded in sympathy. All I wanted was a toasted bagel, but had clearly spent more time ensuring my chips weren't overheating than checking all was well with my ageing kitchen appliances. Fortunately, no person, property, peripheral or bread product was harmed, but I think there's a warning to all overclockers in there somewhere.

Thankfully I had a spare sandwich to hand, as well as a set of most revealing results concerning what happens when you try to get a pair of CPUs working together under different chipsets. Also this month I discovered that choosing the right sound card really can make all the difference in terms of getting the best frame rates in games and even when decoding MP3 files.

Dual to the death

There was a time when dual CPUs were exclusively the platforms for servers and



MicroStar's 694D Pro is the first dual-FC-PGA motherboard we've tested. It's pictured here with a pair of 866MHz Pentium III CPUs, cooled by those impressive Titan Majesty fans

high-end workstations, but then Abit changed all that with its BP6 motherboard. Abit proved that, despite the lack of official certification from Intel, it was in fact possible to get a pair of cheap Celeron processors working together. A suitable operating system such as Windows NT/2000 or BeOS

later and a huge number of PC enthusiasts found themselves owners of a remarkable little performer at a low, low price.

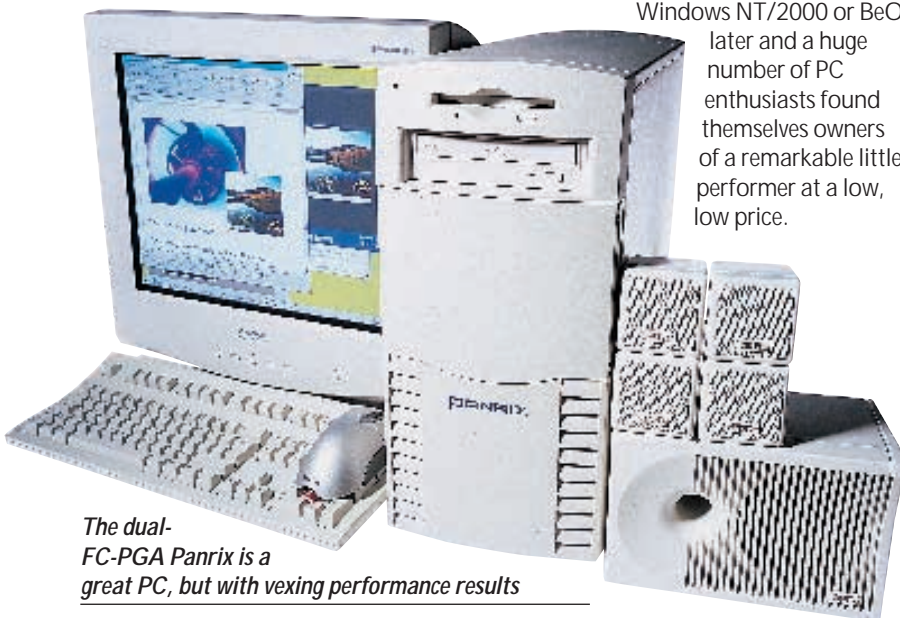
Sadly, the BP6's days are now over. The Intel BX chipset around which it is based has become as good as extinct, and the Plastic Pin Grid Array (PPGA) sockets Abit employed won't talk to anything faster than the 533A Celeron or the 600E Pentium III.

For a short while, it looked as if the BP6 may enjoy a stay of execution, as Powerleap developed its NeoS370 adaptors, which allowed these newer Flip Chip-Pin Grid Array (FC-PGA) CPUs to work in the older PPGA sockets. Curious parties need only check out the unofficial, but extremely informative BP6 website at www.bp6.com to see that even the most persistent enthusiasts couldn't get a pair of Neos working together. I had a go a couple of months back, but couldn't even get one of them working, let alone two at the same time. Rumours suggested that a BIOS update along with tweaked Neo adaptors would do the trick but, to be honest, I'd lost interest.

Instead, I thought I would wait for the inevitable raft of dual-FC-PGA motherboards to arrive. This took a little longer than I first expected, with a handful of samples at the Taiwanese Computex show, but none that made their way into my sweaty palms. Then for September's issue I tested a system from Panrix featuring the first dual-FC-PGA motherboard I'd seen: the MicroStar 694D Pro, based around VIA's Apollo Pro 133A (694X) chipset. After enjoying the often large performance boosts of the dual-Celeron BP6, I looked forward to throwing everything I could imagine at it.

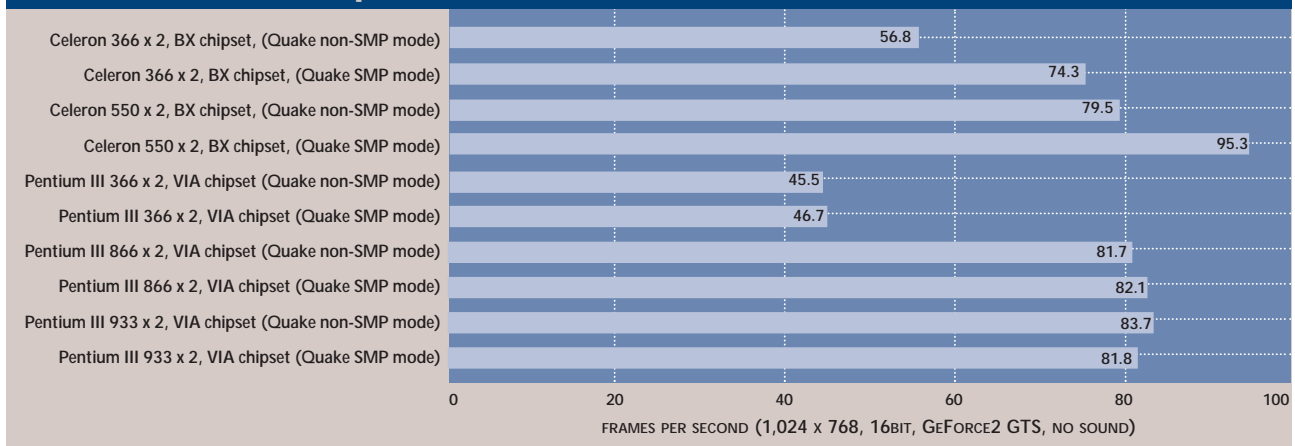
While undeniably an excellent PC overall from Panrix, I was, however, a little vexed by some of the results. In our 3D Studio Max rendering test, not to mention my own SETI@home sample work unit, the pair of 933MHz Pentium IIIs weren't as quick on the MicroStar motherboard as they had been on an earlier dual-933 system using an Intel 840 chipset motherboard.

These were tests that almost exclusively taxed the CPU and chipset,



The dual-FC-PGA Panrix is a great PC, but with vexing performance results

Quake III Arena performance scores



If your graphics card boasts nVidia's GeForce2 chipset, mosey on down to its website and pick up its Detonator 2 drivers

leaving the hard disk and graphics card virtually untouched. Could it be that the VIA chipset wasn't as good in dual configurations as the Intel 840 chipset? Was the VIA in fact any better than the BX chipset at dual systems? After a quick Quake III Arena test that revealed the VIA chipset system slows down by a couple of frames while in dual-CPU mode, I thought I'd better investigate further.

The test

Top PC kindly lent me the MicroStar motherboard, which it says it will sell for £99 ex VAT, although it wasn't available to end users at the time of writing. I built a system using this motherboard, a pair of 866MHz Pentium IIIs, 128MB PC133 SDRAM, a 13.6GB UltraDMA66 Quantum Fireball Plus KX hard disk and a Creative Labs GeForce2 GTS graphics card – Windows 2000 Professional was

used as the operating system.

I installed nVidia's own Detonator 2 drivers, which significantly improved the performance of my graphics card as documented in last month's column. Using the standard Quake III Arena's Time demo option on demo001 with the settings at maximum detail, 16bit textures and 1,024 x 768

resolution, I scored 81.7fps – note that this was without sound.

Quake III Arena can make use of a pair of CPUs through its Symmetric Multiprocessing (SMP) mode, although this feature is not particularly well documented. At the Quake console, simply type

```
r_smp 1
```

and restart Quake. We've found it sometimes crashes, but after a couple of relaunches, you should get it working. Rather worryingly, however, in dual-processor mode, my dual-866 system only mustered 82.1fps – a rather unimpressive half a frame extra.

For good measure, I tried overclocking the CPUs. At 1,000MHz, the system failed to boot, but seemed to be fine at 933MHz. At this speed using one CPU, Quake scored 83.7fps, but in dual mode actually dropped to 81.8fps.

Yes, this time in dual-CPU mode, Quake actually scored fractionally lower than in single CPU mode.

Disappointed and confused, I retested my system with slower CPUs to see if it were high-MHz-related. My 866MHz IIIs are in fact unlocked Intel test models, allowing me to drive them at lower speeds, so for fun I fired them up at 366MHz on a 66MHz front-side bus. While this time scoring higher in dual-CPU mode, the results were still only 45.5 and 46.7fps respectively.

Was Quake simply not making the best use of a pair of CPUs, or was the VIA chipset to blame? Maybe it was the graphics drivers, as in the past we have experienced some dual-CPU incompatibilities with certain drivers. I had in fact tried retesting the system with Creative's own graphics drivers, but they didn't want to work at all on my new system, let alone in Quake. There was only one other course of action: build a dual-CPU system using a different chipset.

Return of the BP6

Luckily I had another dual-CPU motherboard to hand: Abit's BP6, which uses Intel's BX chipset. Sadly, as explained earlier, it's incompatible with my FC-PGA IIIs, so I instead had to test it using my ancient pair of 366MHz Celerons. Using exactly the same memory, hard disk and graphics card, I installed Windows 2000. This time though, nVidia's GeForce2 GTS drivers were proving problematic, forcing me to use the lower performing Creative Labs drivers.

In single-CPU mode, my 366MHz Celeron system scored 56.8fps, but firing



up in dual mode increased this score to a whopping 74.3fps. I then overclocked the front-side bus to 100MHz, forcing the Celerons to run at 550MHz, at which they scored 79.5fps in single-CPU mode and 95.3fps in dual-CPU mode.

Take a closer look at those figures: from 366 to 933MHz on the VIA motherboard, Quake Arena scored virtually identically in single or dual-CPU mode, but from 366 to 550MHz on the BX motherboard, Quake enjoyed an increase of almost 25 per cent in dual-CPU mode. Most damning of all were the

scores of the 366MHz Celerons versus the pair of Pentium IIIs clocked down to 366MHz – remember this PIII boasts double the Level 2 cache of the Celeron and SIMD extensions too. Even then, the Celerons scored 56.8 and 74.3fps compared to the Pentium IIIs at 45.5 and 46.7fps in single and dual-CPU modes respectively. Clearly Quake isn't at fault in dual-CPU configurations, with the finger instead apparently pointing at VIA's Apollo Pro 133A chipset.

As a quick aside, it's well worth considering those scores again: a single

Celeron running at 550MHz scored 79.5fps in Quake III Arena when using a GeForce2 GTS graphics card, while a single 366MHz Celeron still mustered a pretty respectable 56.8fps. That is pretty impressive and perfect evidence that a decent graphics card can totally revitalise even a fairly modest CPU-based system for games.

Back at the VIA versus BX chipset contest, I ran my standard SETI@home work unit, timing how long it took to get from one to two per cent complete. The VIA system with Pentium IIIs running at 933MHz scored five minutes 35 seconds, compared to four minutes on a dual-933MHz Intel 840 system I tested earlier. For the record, the dual-Celeron BP6 system ate through the same work unit in 10 minutes 45 seconds and seven minutes 12 seconds at 366MHz and overclocked 550MHz settings respectively, while a single 1,000MHz CPU on a BX-based motherboard took nine minutes 40 seconds.

As with all aspects of PC benchmarking, there are always several variables you can't control or have to overlook. I really would have preferred to use the same graphics drivers, although in earlier tests, the VIA board should have had the advantage by using the newer Detonator 2 drivers. More importantly, the same CPUs should have been used for both tests. Unfortunately, the BP6 will not talk to FC-PGA IIIs, and the MicroStar board didn't seem to want to recognise my second Celeron – I'll give this another shot for next month, though.

The fairest test would be to get hold of a dual-BX or 800 series motherboard that can talk to my pair of FC-PGA Pentium IIIs and see how this compares with the VIA board; personally speaking, I've got my eye on an old Asus P2B-D dual Slot 1 board. This is my plan for a future column, at which point I will confidentially be able to report which chipset platform is best for dual-CPU configurations.

Sound advice on improved graphics

Several months ago I tried an experiment to see if sound made a big impact on overall system performance. I was really doing the tests to see how Aureal's A3D 2 sound system compared sonically to Creative's EAX when both were operating in four channels, but thought I'd run some benchmarks as well.

It proved fortuitous, as it turns out audio has a massive impact on system performance, particularly when games were running in four-channel modes. I recently re-ran the tests on a 600EB Pentium III fitted in an Asus P2B BX-chipset motherboard with 256MB of PC133 SDRAM and a Creative Labs GeForce2 GTS graphics card under Windows 98 SE.

Using the standard Quake III Arena settings, I scored 98.9fps without any sound at all. Fitting a VideoLogic SonicVortex 2 sound card, this score dropped to 82.1fps with plain stereo sound (set to high quality in Quake). Consider that: a performance hit of almost 20 per cent just by adding stereo sound. I was,

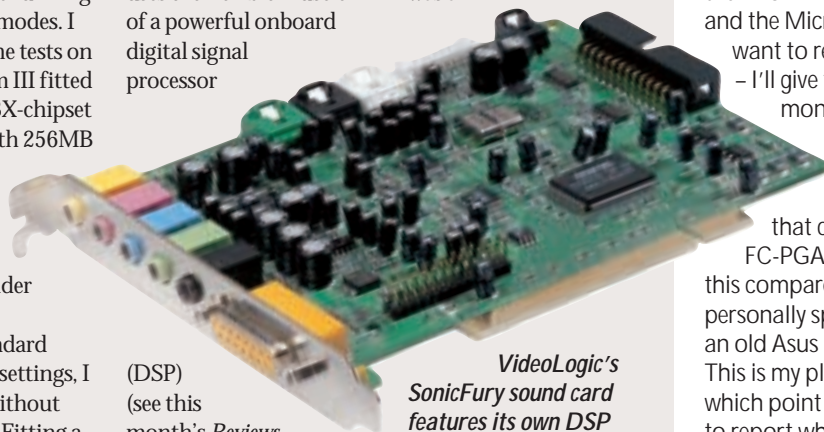
however, more interested to note an 11 per cent CPU hit while listening to a 96Kbits/sec MP3 file using Media Player 7 on the same system – if you're running several applications while listening to MP3s on a modest system, you could quickly run out of sufficient resources.

I did, however, have the chance to try out VideoLogic's new SonicFury sound card (£79.99 inc VAT), which uses the flexible muscle of a powerful onboard digital signal processor

(DSP) (see this month's *Reviews* section). It also features genuine six-channel output and onboard decoding of Dolby Digital 5.1 soundtracks when driven by a suitable optional software DVD player, such as the multi-channel version of

InterVideo's WinDVD 2000 (approx £35).

In Quake there was, however, hardly any difference at all in high-quality stereo mode, with a result of 84.5fps – an increase of just two frames per second. However, when decoding MP3s, the SonicFury's DSP really kicked in. Decoding the same MP3 file now only occupied one per cent of my processor's time, compared to 11 per cent on the SonicVortex card. I was a



VideoLogic's SonicFury sound card features its own DSP

bit of a sceptic when it came to benchmarking system performance using different sound cards, but it seems that there can be significant differences. VideoLogic: 01923 277 488 www.videologic.com

CONTACTS

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Top PC 0113 242 2416 www.toppc.co.uk



Templates for all

Can't find the right words? Microsoft's template gallery should help you with any situation

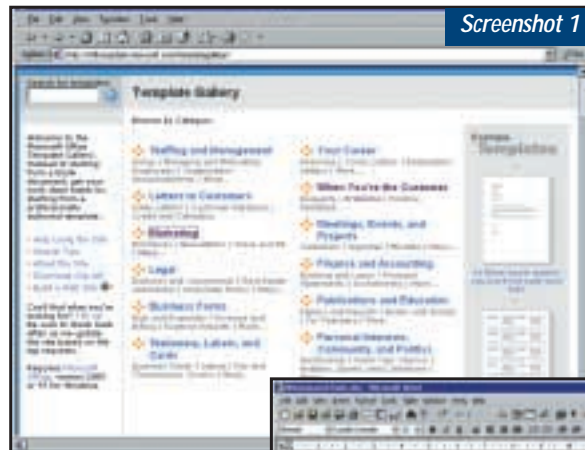
Good news for those who are unimpressed by the rather dismal range of templates that ship with Word 97 and 2000. Browse the Microsoft Office Template Gallery at <http://office.microsoft.com/templategallery.htm>. Here you'll find forms, letters and other documents covering just about every situation; including 12 ways of jacking in your job (all disappointingly polite) and 30 letters of complaint. Among the latter is the impressively titled: 'Your product is falling apart...'

If you've just read the Hands On Windows column, note that you have to have cookies enabled in order to use the templates, otherwise you get stuck in an endless cycle of reading the end-user licence agreement. Having done that, you can preview each template, and when you find one you like, load it straight into Word (97 or 2000). I've had a quick look at some of these, and there doesn't seem to be much in the way of visual style, but if you're stuck for words, you may well find a way to draft that difficult letter.

Monospaced alternatives

Several of you have asked if there are any alternatives to the TrueType Courier font, to use when a monospaced typeface is needed. One reader described it as 'looking like something from an old typewriter' and asked what the font we use for, say, the programming code boxes. To answer the first point, Courier was indeed originally designed for IBM typewriters. It was later remodelled for the Selectric series by the illustrious typographer Adrian Frutiger, who created many typefaces, including the Univers family. So, despite the 'typewriter' tag, the current Windows version, designed by Howard Kettler, has an impressive pedigree.

However, it may not be everyone's choice and certain characters – notably the w and x – change shape on screen at different point sizes. The font we use is OCR-B from Adobe. This is not a standard Windows font, but OCR-A is. However, the latter is anything but eyeball-friendly, as screenshot 2 shows.



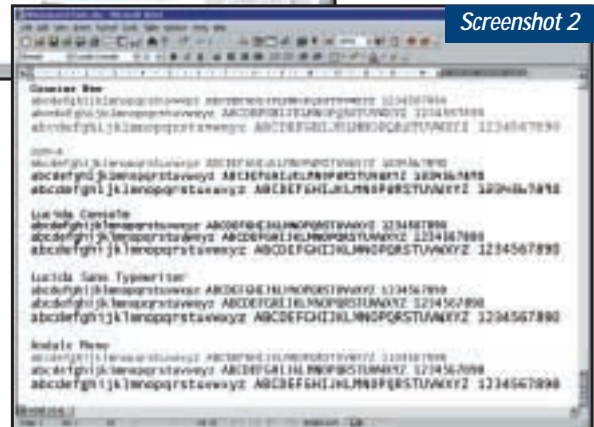
Left: Templates for all occasions are online at the Microsoft Template Gallery

A better alternative sans serif monospaced font is Lucida Console, again a standard Windows 98 font. This is very easy to read on screen, as the name suggests. Lucida Sans Typewriter, which ships with Microsoft Office, isn't as easy on the eye on screen, but has the edge in print.

Finally, Andale Mono is available as a free download from www.eu.microsoft.com/typography/downloads. This, again, is designed for print rather than screen, but has the advantage of a dotted zero, which helps to distinguish it from the letter O in code. Finally, if you're just looking to align columns of figures, then don't worry: practically every TrueType font has monospaced numerals.

Square world

In August's column I discussed the problem of getting Word 2000 to autocorrect square and cubic metre quantities typed as m2 and m3 into their properly superscripted forms. In Word 97, this worked without having a space between the quantity and the unit: in Word 2000, there must be a space. Having discussed workarounds for this, I have been taken to task. Jonathon Taylor has pointed out that the ISO standard 31-0:1992 (E) states there should be a space between the quantity and the unit. This goes for all Standard International



Below: Monospaced fonts including OCR-A and Andale Mono – free up-to-date alternatives to the 'old-style Courier

units, including temperature; hence 10 °C, not 10 °C or 10° C. Another reader P Hodgson quoted a similar ruling from BS 5775 – Specification for Quantities, Units and Symbols. So my apologies: it looks as though Word 2000 had it right all along.

Finally, here's a neat little tip sent in by reader Roger Limbrick. I've been using the same tip in Windows for years, but never realised it works in Word too. Control & drag copies selected text to another place in the document, leaving the original in place. It works on graphics as well as text, so it is a good way of making repeated patterns or duplicating logos and other 'page furniture'.

CONTACTS

Tim Nott welcomes your comments on the Word Processing column. Contact him via the PCW editorial office or email: wp@pcw.co.uk. Please do not send unsolicited file attachments.

Pack the tracks

Stephen Wells finds the optimum sequence for making the best use of your greatest hits tape

An interesting problem came my way from Colin Mercer: 'I wish to tape tracks from a CD to tape. I have no preference as to which tracks appear or in which order, however I wish to obtain optimum usage of the tape, say 30 minutes duration. For example the track lengths could be as follows: 1) 00:16:41, 2) 00:02:07, 3) 00:03:29, 4) 00:01:46, 5) 00:09:45, 6) 00:07:11, 7) 00:04:24, 8) 00:04:57. Total = 00:50:20 Is there a function or VBA methodology within Excel to enable me to automatically compute the optimum selection?'

Here's a simple way of doing it. Screenshot 1 shows the track numbers listed in column B and the duration of the tracks are entered in column C, formatted in hours, minutes and seconds. Column D is formatted as a number with two decimal points. Cell D2 has the formula:

=CONVERT(C2,"day","mn"). The CONVERT function is in the Analysis ToolPak Add-In and it is used here simply to convert the duration times to minutes and decimal fractions of minutes. This formula is dragged down to cell D9. Cell B14 holds the number 30 as that, in minutes, is the tape length.

MAX(D2:D9) is entered in cell D14 to put the longest track first. Cell D15 has =IF(D14+D3>\$B\$14,0,D3), meaning if the length of the second track added to the length of the first is less than 30 minutes, enter the second track. The running totals are kept in the range I16 to I22. Cell I16 has the formula, =D15+D14. Cell I17 has =D16+I16 and this formula is dragged down to I22 which has =D21+I21. Cell D16 refers to this total with the formula =IF(I16+D4>\$B\$14,0,D4) and this is dragged down to D21, which has =IF(I21+D9>\$B\$14,0,D9). Cell D22 totals the amount of minutes of the tape used by the transfer.

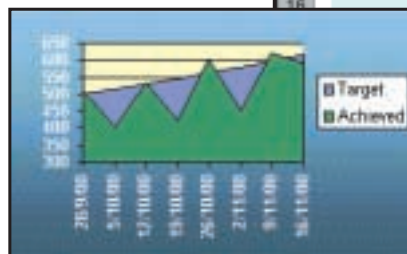
Cell C14 has =IF(D14=D2,B2,0) and this formula is dragged down to C21. The formula recognises the track number from its length so we have to hope that no two tracks have

	A	B	C	D
1		Track	Time	Minutes
2		1	0:16:41	16.68
3		2	0:02:07	2.12
4		3	0:03:29	3.48
5		4	0:01:46	1.77
6		5	0:09:45	9.75
7		6	0:07:11	7.18
8		7	0:04:24	4.40
9		8	0:04:57	4.95
10				
13		Total	Track	Minutes
14		30	1	16.68
15			2	2.12
16			3	3.48
17			4	1.77
18				
19				
20			7	4.40
21				
22			Total	28.45

Screenshot 1
Above: Figuring out the maximum number of tracks you can transfer from a CD to a 30-minute tape

Right: Sorting the same list of tracks first can let you use more of the tape

	A	B	C	D
1		Track	Time	Minutes
2		5	0:09:45	9.75
3		6	0:07:11	7.18
4		8	0:04:57	4.95
5		7	0:04:24	4.40
6		3	0:03:29	3.48
7		2	0:02:07	2.12
8		4	0:01:46	1.77
9				
10				
13		Total	Track	Minutes
14		30	1	16.68
15			5	9.75
16			0	0.00
			0	0.00
			0	0.00
			3	3.48
			0	0.00
			0	0.00
			0	0.00
			Total	29.92



An area chart is good for showing results against targets

been entered as having exactly the same duration.

The solution assumes that, after including the longest track, 'optimum selection' means transferring to the 30-

minute tape the maximum number of tracks. However, if it means using up the most amount of tape then we can make a variation. Click within the range B1 to B9 (say, B3) choose Data, Sort, Minutes, Descending. Now the tracks are listed as in screenshot 2. The number of tracks transferred is reduced but less of the tape is left unused.

As music stores these days usually stock many more CDs than tapes, other readers may share Colin's problem and can suggest an alternative to my solution. There's a book token for the reader with a better one. Send a brief description and listing within the text of an email, with no attachments, to the address below.

Drawing a picture

Jim Garnett produces simple line charts plotting results against weekly targets. 'I want to plot values below target as one colour, and above target as a different colour.' An area chart is good for this. Enter your weekly dates on one row of a worksheet with your target figures in the row below and the achieved results on the next row. Highlight the whole range and click the Chart Wizard tool. Choose Chart Type, Area and then the first of the six types offered. Click Finish. Then right-click on the y-axis and choose Format axis, and under Scale

change the Minimum to something above zero if you prefer. See chart left.

CONTACTS

Stephen Wells welcomes your comments on the Spreadsheets column. Contact him via the PCW editorial office or email spreadsheets@pcw.co.uk. Please do not send unsolicited file attachments.



May I join your table?

From the inner-most join to the outer limits, it's worth understanding tables, says Mark Whitehorn

We tend to use joins between tables without too much thought, which is as it should be.

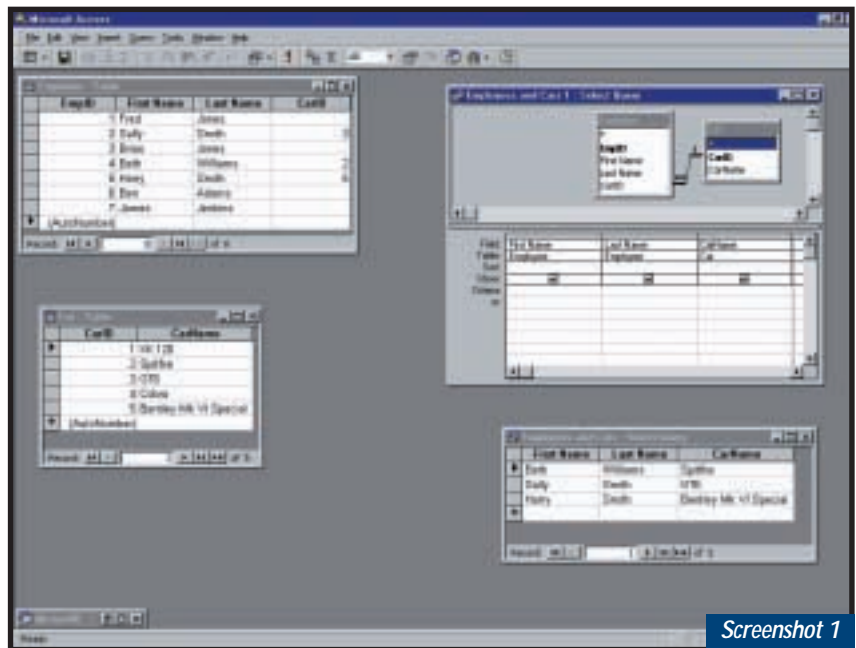
But occasionally they are worth knowing about in more detail because then you can use them to your advantage.

The default join is technically called a Natural or 'inner' join. This simply matches data in the two fields concerned and produces a table that has a row for every match. So, given the tables CAR and EMPLOYEE in screenshot 1, the natural join in the query produces rows only for those employees who have been allocated cars. But what if we want a list of all cars and the employees who have them (screenshot 2, opposite)? The answer is to use an outer join. In Access you can produce this by double clicking on the join and selecting the appropriate option (screenshot 3).

In SQL this reads as:

```
SELECT Car.CarName, ✓
Employee.[First Name], ✓
Employee.[Last Name]
FROM Car LEFT JOIN Employee ON ✓
Car.CarID = Employee.CarID;
(Key: ✓ code string continues)
```

I realise it doesn't say OUTER join in the SQL, it says LEFT – but that is simply short for LEFT OUTER. As an exercise, try playing around with this statement (see DBCNOV00.MDB on this month's cover disc) and varying it to read, oh, let's pick an option at random here, RIGHT. More



Screenshot 1

An inner join – nothing suspicious here...

```
FROM (Car LEFT JOIN Employee ✓
ON Car.CarID = ✓
Employee.CarID) INNER JOIN ✓
Sale ON Employee.EmpID = ✓
Sale.EmpID ✓
ORDER BY Sale.SaleID;
```

Planning permission

It is an immutable law of the universe that, as soon as the inhabitants of a planet discover the Internet, the speed of change of business requirements

build today had better be adaptable or you're in deep yogurt. So, how do you create adaptable databases?

One trick is to be able to recognise both under and over-planning, because both are deadly, and then be able to plot a sensible course between them. And in case you are wondering why I am so interested in this subject all of a sudden, it is because in the past month I have come across classic examples of both, so I'll use these to illustrate the points. The details have been changed to protect the guilty.

A company needed a simple database to track orders. It was written in Access 2.0 by two temporary employees (actually students on day release) during the summer of 1997. They went the way of all students (back to college) and, since then, the database has been extended by a variety of employees and other students. I was asked to have a look at it, by which time it had reached an interesting state. The process of continual refinement means that the database is currently exactly what the company needs – everyone is happy with the functionality. The bad news is that it

Any database you build today had better be adaptable, or you're in deep yogurt

on this next month, including why some outer and inner joins are incompatible and what you can do about it.

As a hint see the query called 'Sales Information – broken' which is:

```
SELECT Sale.SaleID, ✓
Employee.[First Name], ✓
Employee.[Last Name], ✓
Car.CarName, Sale.[Sale ✓
Details]
```

increases by a factor of 2.54213. Another immutable law of the universe is that, no matter what database you build for a client, the specification for that database will change with time. This change can be driven by a number of factors, but a crucial one is the changing business requirements of the company.

Put these two laws together and we can derive a third – any database that you

crashes at irregular (but frequent) intervals and that the database itself is totally gnarly – by which I mean that the structure and code are entirely undocumented and horribly tortuous because constant change has been imposed upon an initial poor design. The last few updates have resulted in more problems than they fixed.

The root problem here is, of course, under planning. If the database had been carefully structured and documented from the start, and if the subsequent changes had been made with reference to that information, then the database would be fully functional and ready to accept future change.

For the other database example, I've been called in to arbitrate between a company and its database developers (never a happy position – everyone ends up hating you). This database started off well. An initial spec was written, the database development company quoted for the job and was awarded the contract.

Since then the project has become thoroughly bogged down because, even before a detailed spec could be finalised, the basic requirement changed. Then a merger changed the spec again. The situation wasn't helped by the departure of the project leader (from the database company) for a better paid job.

A critical factor here is that the database is complex – the initial specification shows that the company wanted it to do everything: track orders, allow sales people to work remotely and then sync data, control stock levels, email orders to sub-contractors, you name it and this database application was going to do it. In my opinion the spec was over-ambitious and the resources allocated were too spartan. The result was that the change always outstripped development.

The take-home message in both these cases is easy to give – plan your database at an appropriate level. Of course, finding the appropriate level is tricky, but a few pointers may help. Even if the database is simple, ensure that the

The key to accessible Access

Some of you may know that from time to time I also write books on databases as well as this column. Well, the latest one is *Accessible Access*, which I've co-written with Bill Marklyn.

Rather than be predictable and tell you that it is wonderful and that you must buy it, I'll tell you why you shouldn't buy it.

Do not, under any circumstances, buy this book if you are reasonably familiar with Access. As

the title suggests, it focuses directly on Access (rather than databases in general) and assumes that you know nothing about Access.

This book is not a programmer's guide to Access, nor is it one of those huge books that tells you everything you wanted (and didn't want) to know about Access. So, don't buy it if you are already an Access head.

On the other hand, if you are new to databases and just starting to use

Access, then it is the bee's knees (but then I would say that). Bill worked for Microsoft as the original development manager for Access. He was in charge of the overall design of the product, so it is fair to assume that he knows it reasonably well.

We have tried to focus the book on the core information that you need to get started. The great news is that you can buy the book through *PCW* (see this month's *Reader Offers* for more details).

CarName	First Name	Last Name
MK 120		
Spitfire	Beth	Williams
GT6	Sally	Smith
Cobra		
Bentley Mk VI Special	Harry	Smith

...So, how do we get a list like this one? Answer, by using an outer join

rather than trying to create the full monty in one go. Of course, keep the overall plan at the back of your mind and, again, structure the database so that it can be expanded easily.

In case you're curious, the solutions in these particular cases were moderately easy.

In the first one we simply treated the existing database as if it was a very detailed User Interface spec. Using that as the requirement we rewrote the application from scratch in Access 2000, without even looking at the existing table structure or the code.

For the more complex one, it became increasingly clear that the road warriors would gain huge benefit from a really simple application. This consists of a single table (products) and an interface where they can type in some customer specs and get a short list of relevant items. Implementation took less than a week.

structure is well constructed (normalised tables, referential integrity enforced, and so on). And again, even if it is simple, document it so that when someone else makes the changes that will inevitably be required, these can be well integrated. If the database is complex and it is clear that the planning is going to be long and arduous, then either allocate huge resources (to cut down the development time) or think very carefully about abandoning the big plan. Think about starting small and planning to expand later. Look for some immediate benefit that will make a significant difference to the organisation and implement that

CONTACTS

Mark Whitehorn welcomes your feedback on the Databases column. Contact him via the *PCW* editorial office, or email: database@pcw.co.uk



Latently obvious

Niall Magennis shows you how to keep latency troubles to a minimum and your tunes in time

Using PCs for music can sometimes feel a bit like tackling a meal of meat and two veg with a pair of chopsticks. You can get the job done, but it ain't half a bit of a chore trying to work your way through the experience.

One of the main problems with using PCs for recording music is that of latency. There are two types of latency issues associated with PCs. The first will have affected anyone who has tried to record acoustic instruments using a multitrack recording package, such as SAW from IQS, or an audio plus MIDI sequencer in the mould of Cubase or Logic. We'll call this the 'audio-to-audio' latency problem. It manifests itself as a delay between you playing the instrument into the PC and the audio signal (being used for monitoring purposes) being heard from the sound card. A delay of more than about 10ms pretty much makes it impossible to give a performance and listen to the monitor signal at the same time.

The second type of latency has become apparent since the introduction of software synths such as Generator or the VST instruments used with Cubase and Logic. Here the delay is the time between triggering the softsynth from a MIDI keyboard and hearing notes emanate from the sound card. Again, it makes it difficult to play in real time.

So how do these latency problems come about? There are a number of issues at the core of the problem, such as the time it takes the operating system and audio software to process the audio, but the biggest single factor is the type of sound card driver you are using.

Latencies can range from between 700ms on older ISA cards, such as the ISA SoundBlaster AWE64, when using MME drivers, to as low as 3-4ms using modern multichannel audio cards with ASIO drivers, such as the Echo Darla. If you need to monitor audio signals in real time then you should be aiming for a

setup that gives you a latency figure of about 10ms or less, as anything in this range is good enough for most of us not to notice any delay.

However, to get these kind of results you are really going to need a sound card with ASIO drivers. ASIO is a proprietary sound card driver standard developed by Steinberg, the software house behind the Cubase range of sequencing software. It is a standard designed specifically to reduce audio latency levels to those acceptable to musicians.



The EWS88D's drivers give 8ms latency at 336 samples

Version 2 of the standard now offers such features as direct hardware monitoring from the sound card itself, which completely bypasses the OS and sound card driver and thus gets around all latency issues that hamper monitoring. The only problem with hardware monitoring is that you cannot monitor recordings complete with software plug-in effects. This is because it only allows you to listen to the dry signal from the sound card's inputs.

Most semi-professional cards, such as those from Echo and Terratec, come with high-

performance ASIO drivers. For example, the drivers for the Darla, when set to 44.1KHz, give 4ms latency when used with a buffer of 128 samples, and those of the Terratec EWS88D give 8ms at its lowest buffer setting of 336 samples.

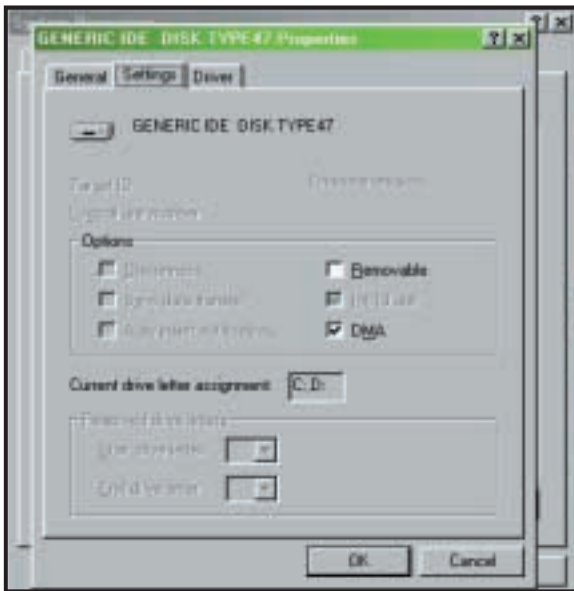
However, if you're using a consumer card you're not going to be able to achieve such low latency levels. You can avoid the horrendous latencies associated with MME drivers by using a consumer sound card's DirectX drivers. In the past it was not possible to record audio while using DirectX drivers. In your sequencing application you had to skip between DirectX drivers for playback and MME drivers for recording. Hardly an ideal situation.

However, since version 6.1 of DirectX, functionality has been built into Microsoft's API to allow recording, too. This is the reason a new DirectX full-duplex option has appeared in Cubase V5, but unfortunately, I couldn't get it to work with my SoundBlaster PCI64. This may be due to a lack of support for recording in the sound card's drivers, but to be honest I can't be sure where the problem is likely to lie and a call to Arbiter, Steinberg's distributors in the UK, left me none the wiser.

If you opt for the Cakewalk V9 sequencing package, there is a different way of reducing latency associated with MME drivers. Cakewalk calls this new



Cubase V5 has a new full-duplex DirectX option



If you enable DMA data will be moved straight into RAM bypassing and reducing the strain on the CPU

technology Wavepipe and it works with standard MME drivers rather than DirectX, so there is no problem using it for both recording as well as playback.

I tested it on my 500MHz Celeron PC for the review back in April with both a cheap sound card based on Creative's AudioPCI chipset and a mid-range Event Darla. On the Darla, Wavepipe drastically reduced the latency to 44ms, but using the AudioPCI card the lowest I could get was 186ms – which is very good for such a cheap card but not quite as impressive as I had hoped.

It seems that Wavepipe depends a lot on both the quality of the MME drivers available for the card and the type of hardware used in the card. However, if you're using a consumer card, you're probably going to get much better results with Cakewalk than you will if you're using one of the competing sequencers. It might be worth trying out a demo version of the software to see how your card performs.

Whatever card you are using, you should pay a trip to the audio setup menu of your sequencer and try out different driver and buffer settings to find out what your card is capable of. Don't assume that DirectX drivers will give you lower latency – well written MME drivers may produce better results. Often you'll find that the standard settings are a touch on the conservative side and that you'll be able to lower your latency values by reducing the buffer size that

the sequencer is using for playback.

Another common problem is that of dodgy MIDI timing. If you've got an older ISA card, then it really is time to upgrade to a PCI version. Many ISA cards suffered MIDI timing problems when they were asked to play audio and MIDI simultaneously. For really tight timing you're best off opting for a dedicated MIDI interface, such as those available from Mark of the Unicorn (www.motu.com).

Each sequencer and MIDI interface manufacturer will have

specific tips on how to improve MIDI timing performance, so you should check out any FAQs on their sites. You should also carefully read through the documentation that comes with your interface to make sure you have it set up correctly.

For example, with parallel MIDI interfaces you should make sure that the settings for the parallel port in your BIOS match those

recommended by your MIDI interface's manufacturer. Also, for Cubase, you should make sure that the pre-roll setting is at least as big as your audio latency setting. If you're having a problem with a SoundBlaster Live! card, you may be able to solve it by setting the pre-roll value to a larger number than your audio latency setting.

For generally improved performance, you should make sure that any EIDE hard drives you are using are set to use Bus-Mastering DMA. Without this, not only will your drive's performance suffer, meaning that you'll be able to record fewer tracks

simultaneously than your system should otherwise be capable of, but you'll also be tying up your processor needlessly as it gets involved in transferring data to and from the drive.

Enabling DMA means that the drive can transfer data directly into RAM without bothering your CPU. This will free up your CPU to perform other tasks such as taking care of soft synths or DirectX plug-ins. To check your DMA settings, go to Control Panel, System, Device Manager and then click on your hard drive and select the Settings tab.

If your CPU is really suffering under the strain of playing back multiple tracks, the easiest way to free up extra power is to reduce the sample rate you are using. For example, moving from 44.1KHz to 32KHz will not produce much of a degrade in audible sound quality, but will reduce the load on your processor by a significant amount.

Despite all the problems that can happen along the way, it is possible to get Windows to behave when dealing with audio, especially if you have a reasonably fast system with a sound card that has ASIO drivers. Just make sure that you spend some time setting up your system properly before you jump right in and get to work on some serious tunes.



Steinberg has a list of sound cards with ASIO drivers in the KnowledgeBank section of its website

CONTACTS

Niall Magennis welcomes your comments on the Sound column. Contact him via the PCW editorial office or email: sound@pcw.co.uk



Embed your graphics

Ken McMahon shows you how to use inline frames to create margin graphics in Adobe InDesign

When Adobe launched InDesign it rewrote the book on typographical control, previously authored by QuarkXpress. The great thing about InDesign is not just that it offers amazing control with incredible accuracy, but that it makes it so simple. So sophisticated were InDesign's typographic tools that little was added when version 1.5 was released earlier this year, other than text on a path features.

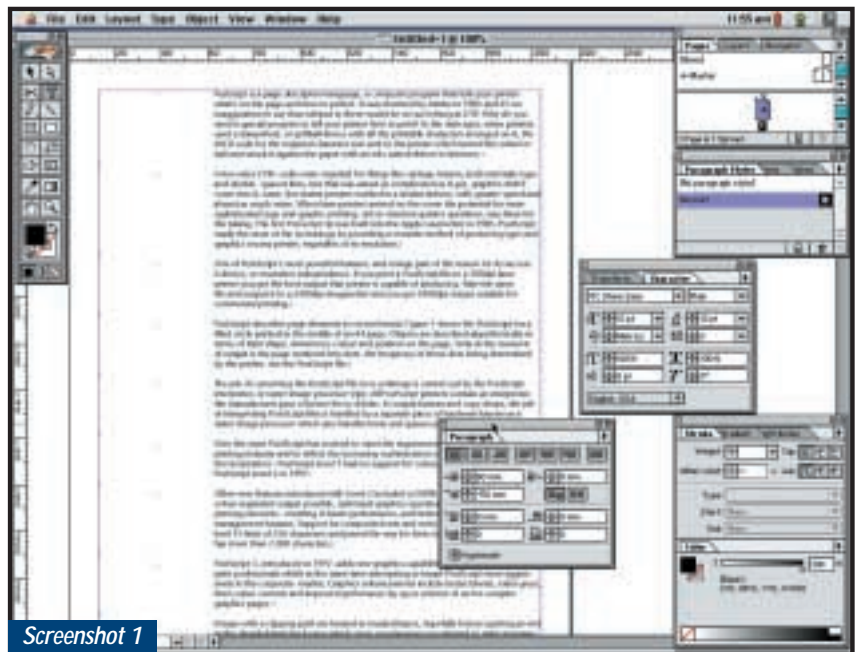
Often, bad typography is less the result of carelessness on the part of the designer than shortcomings of the software. Either it's impossible or too much trouble to take that extra step towards typographic perfection. Whether we're talking about bad line breaks, poor kerning, margin alignment or poorly positioned graphics, a 'good enough' decision gets made in favour of the laborious and time-consuming alternative.

One of the banes of the layout artist's life is the problem of positioning graphics within text. In the bad old days, text and graphics were not good neighbours and had little to do with each other. Text lived in text boxes, graphics lived in picture boxes. You put your text and graphics on the page and if one moved, the other nonchalantly ignored it.

Here's how it usually worked. You spent weeks putting together a manual with a small graphic in the margin opposite each paragraph and then

It's impossible or too much trouble to take that extra step towards typographic perfection

(usually just after you've sent the job to the bureau for output) a last-minute decision is made that the first paragraph is not only entirely irrelevant, but libellous and must be removed. All the subsequent paragraphs dutifully flow round, but your margin graphics stubbornly remain put. As if it weren't enough of a problem



Screenshot 1

The main text is a hanging indent, with a left indent of 50. The first line has an indent of -50 and is tabbed out to align with the rest of the text. There's now space to insert graphics

sorting out all the new page breaks, you also have to move each individual margin graphic back into position, sometimes over the page, opposite its appropriate paragraph.

QuarkXpress came to the rescue with anchored graphics, which you pasted into the text, but you can't paste grouped objects in Xpress, control over anchored graphics is limited and getting them in exactly the right place can be a time-consuming and frustrating business.

Enter Adobe InDesign and inline

frames. InDesign allows you to embed a frame inline, the frame can contain text or a graphic and you can even embed nested frames inline. For example, you could convert a frame to outlines, paste a picture into it and then embed it in a text frame as an inline graphic.

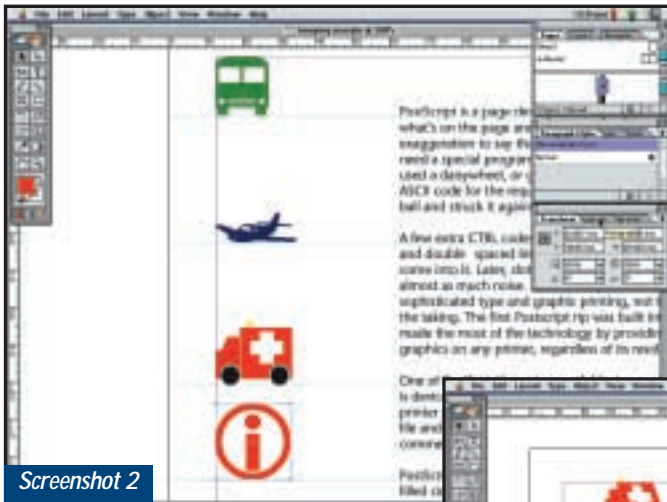
There are three ways to create an

inline frame: you can paste a frame at the insertion point within a block of text; highlight some text and select convert to outline - InDesign creates a frame for each character and embeds them all as a group; or you can place a graphic at the insertion point.

Inline frames can be controlled just like text characters. If you have auto leading applied when you insert an inline graphic, the leading will adjust to accommodate its height. If the graphic is taller than the type, which is usually the case, the line will be pushed downwards to accommodate it. By setting a fixed leading you can prevent this happening, although your graphic will overrun the text if it's too tall.

By default, InDesign places inline frames on the baseline, but by highlighting the frame with the text tool you can adjust the baseline shift as you would with any other character. You can also adjust pair kerning between the inline graphic and the subsequent character, but not the preceding one.

Click on the inline graphic with the selection tool and you can then use the



Screenshot 2

transform palette to change its vertical position (or you can drag it, or use the nudge keys). You can also scale, shear and rotate inline graphics.

Going back to our original example, I'll show you how to create inline margin graphics that align perfectly with the baseline of the first line of text. They can be used to hold either text or graphics, for sophisticated bullet points, icons, or even margin notes.

The first thing to do is set up your main text column as a hanging indent to create the right-hand margin. I've simply placed a block of text on the page, set the type size and leading, then applied a left indent of 50, a first line indent of -50 and single tabbed each first line out to align with the rest of the paragraph (see screenshot 1, opposite).

Next, I've placed the insertion point

When someone says the bus and ambulance are transposed, I know I can get it done quickly

to the left of the tab on the first line of each paragraph and pasted in the required graphic. You may recognise these as characters from the Wingdings font – I converted them to paths in Freehand, coloured them and then dragged-and-dropped them onto the InDesign page. I could easily have done all that and more solely in InDesign, and perhaps we will take a look at some of InDesign's graphic capabilities in another column.

As you can see from screenshot 2, our graphics frames have been positioned inline, all neatly sitting on the baseline. If,

Left: Once the graphics are inline they'll sit on the baseline. But it doesn't take long to edit them to exactly what you want



Screenshot 3

Not only can you edit the graphics, but also if you change the order of the paragraphs, then they will obediently follow

having done this, you then decide that you'd rather have the top of the graphic aligned with the cap height of the first line – using the selection tool – just pull down a ruler and drag them to the new position.

Just to show you how easy it is to edit inline graphics, I've made a number of changes, none of which took more than a few seconds (screenshot 3). First, I changed the order of the paragraphs by cutting and pasting. Next I applied a -20 degree shear to the ambulance graphic. I then noticed that, although the tiny yellow light on the ambulance roof was aligned with the cap height of the first line of text, it didn't look quite right visually, so I baseline shifted the ambulance up by four points until the top of the cab was aligned with the text cap height.

I decided that it would look better if all the graphics were aligned right, so I placed a right tab at 40mm (leaving a 10mm gap before the left margin of the text) and inserted an additional tab in front of the inline frame on the first line of each paragraph.

I then copied some text from the body copy, pasted it into a new frame, changed the background and text colours, copied the frame and pasted it inline to replace the aeroplane graphic.

Having pasted it in, I was able to change the type size and box shape to get the best fit.

As a final *coup de grace*, I copied the information icon, resized it and pasted it as a hanging inline frame within the text box hanging inline frame using exactly the same technique.

Now, when someone says the bus and ambulance are transposed, or that

first paragraph needs to go, I know I can get it done quickly and accurately without giving up my weekend.

OpenType

I couldn't let Adobe's announcement of its first OpenType fonts pass without comment. OpenType is supported by both Windows and MacOS. Adobe has released six fonts in the new format – one that has been long talked up by Adobe and Microsoft. The fonts include one named after Adobe founder John Warnock. Warnock Pro includes Latin, Cyrillic and Greek character sets in a variety of weights and styles. The other faces are Calcite Pro, Siletium Pro, Adobe Garamond Pro, Myriad Pro and Tekton Pro. Let's hope Microsoft and other foundries follow suit.

CONTACTS

Ken McMahon welcomes your comments on the Graphics & DTP column. Contact him via the PCW editorial office, or email: graphics@pcw.co.uk



Human-machine mergers

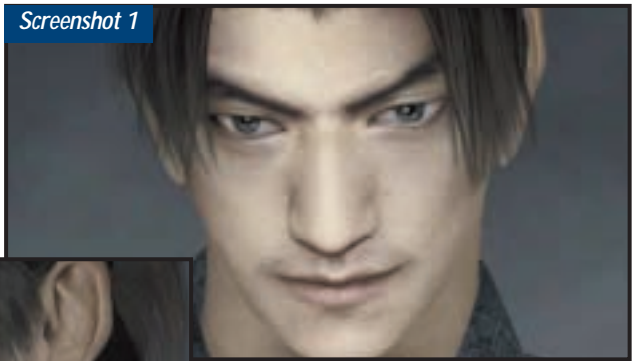
New animations put a smile on the faces of many at this year's SIGGRAPH, says Benjamin Woolley

When I first went to SIGGRAPH, the US computer graphics industry show, in Boston in 1989, the conference was opened by a then little-known member of the US Congress' science and technology committee, Senator Al Gore. 'Information is exploding by leaps and bounds,' he announced, his well-groomed appearance and polished delivery proving somewhat slicker than his choice of metaphors.

This year, at New Orleans, the SIGGRAPH scene-stealer was another internationally famous figure: Kermit the frog. He appeared with Jackie White, SIGGRAPH's chairwoman, or rather a computer-generated rather than latex and fur version of him appeared on a 30ft screen. This virtual Kermit was able to interact with White because he was controlled in real time by a motion-capture system used by a performer from Jim Henson's studios and set up by a company called Performance Capture

Onimusha, the winner of the SIGGRAPH Computer Animation Festival

Screenshot 1



Screenshot 2

'Best of Show' award was the introductory movie for Capcom's PlayStation 2 game *Onimusha*, created by Links Digiworks. Like Kermit, the most interesting feature of the animation seems to have been the way it translated a physical character into a virtual one, although in *Onimusha's* case, the original isn't a puppet frog but a human, Japanese actor Kaneshiro Takeshi, capturing not just his looks but, through motion capture, his movements. The results, as the examples demonstrate (see screenshots 1 and 2), are very lifelike, a clear sign that we are but a few steps away from virtual actors being indistinguishable from real ones.

While *Onimusha* was wowing audiences at the festival screenings, in the show hall a raft of previews and announcements were demonstrating the latest technological developments in character animation. One of the most interesting was FAmous STrEaming or F-A-S-T from Famous Technologies (www.famoustech.com), yet another 3D streaming technology, but this one is specifically designed to deliver 'facial animation' over the Internet in real time.

F-A-S-T is designed to give the web a more human (or at least animated) face, as it allows a talking head to appear on a web page and speak to you. Early demos (see screenshot 3) show that the models are not as lifelike as the sort that appear in movies such as *Onimusha*, but they are impressive given the time a new head takes to download – although you do need a 2MB plug-in to view it in your browser window – and the lip-synch is particularly impressive.

OCR and speech-synthesis pioneer, on the subject of 'the human-machine merger: why we will spend most of our time in virtual reality in the 21st Century'. According to Kurzweil, we are all fated to spend our lives online, connected to shared 'immersive' 3D virtual environments created on the web.

Such visionary images are always being peddled at SIGGRAPH; something very similar to Kurzweil's predictions were being promoted in 1989 by the then conference star, the virtual-reality pioneer

Kermit tossed jokes for the first 10 minutes, and ended the show with a little poetry

Jaron Lanier. But the really interesting visions are to be found elsewhere, in the show halls and the prestigious Computer Animation Festival.

Studios (PCS). Kermit, acting as Master of Ceremonies, apparently 'tossed jokes for the first 10 minutes of the keynote, had a little fun during it and then ended the show with a little poetry, a song, a dance and a cartwheel,' Gary Roberts, head of PCS, told www.siggraphnews.com.

The merging of physical creatures (of the human as well as the amphibious sort) into the virtual realm developed as one of the recurring themes of this year's conference and show. The keynote speech was given by Ray Kurzweil, a scanning,

The annual Computer Animation Festival was the showcase that, in my case at least, first revealed the potential of 3D graphics. In particular, it brought to the graphics industry's attention, and (after a slow, hesitant gestation) Hollywood, the talents of, among others, John Lasseter, creator of *Toy Story*.

This year, the winner of the festival's

Famous Technologies produces a couple of authoring tools for creating virtual characters of your own, including a program called vTracker, which allows a basic form of motion capture using video. I hope to look at vTracker and the whole business of motion capture in a future column.

Meanwhile, an even more ambitious project in creating virtual characters was announced by Reflex Systems (www.reflex3d.com), which launched the 'official' beta of Reflex | DRAMA, claimed by the company to be 'the first software tool available to accelerate and refine production of realistic human models'. Reflex | DRAMA 'merges concepts from bio-mechanics, genetics, symbolic programming, and 3D graphics into a unified framework for human animation'.

In other words, it apparently generates models that in some way capture real physiological features, so that when a model is posed, the skin, muscles and even fat fill out the body in an appropriately realistic fashion. Goodness knows how this works in action. The images on the company's website (screenshot 4) are not all that impressive, but the technology may show the direction in which mainstream character-generating software such as Poser will develop.

From the point of view of general 3D software news, SIGGRAPH proved to be a bit of a damp squib this year, with most announcements being for new versions of existing packages. The character animation theme continued on Discreet's stand, where the latest version of Character Studio 3 was on show. Caligari apparently allowed glimpses of version 5 of trueSpace (for the latest details, go to www.renderengine.com), and Newtek demonstrated version 6.1 of Lightwave.

Perhaps the most significant announcement was the launch of Blender 2.0, which was posted on the web just in time for the show's first day (see below).

Over 25,000 delegates went to New Orleans to attend SIGGRAPH this summer; a huge number. However, more than 30,000 went to Boston in 1989. It would be tempting to see this as a sign



Screenshot 3

Left: The face of the web? These are the F-A-S-T faces on the Famous Technology website, as viewed in a standard browser

Below: Not all that realistic, but this virtual head by Reflex | DRAMA apparently has many of the features of a real head



Screenshot 4

that the graphics industry might have been marginalised by interest in the Internet, but I suspect the opposite to be the case. Graphics have joined, indeed they have become the mainstream. SIGGRAPH stands for Special Interest Group, Graphics. The spread of computer graphics across the web and through our culture over the past decade means that computer-generated imagery is no longer a special interest, but a ubiquitous presence.

Blender

Following the September column, in which a correspondent proposed Blender for the 'most unintuitive program of the year' award, a few readers have sprung to the program's defence. 'I think this

package is the most logical, usable and fast I have tried (up to and including 3D Studio MAX),' wrote Simon Clarke. 'It doesn't crash my machine in either Windows or Linux, which trueSpace, Amapi and Softimage sfx Pro did. Maybe it's the way it has been written, by people who actually use it rather than a committee trying to add functions rather than functionality.'

The truth, I think, lies somewhere between the two positions. Blender is puzzling to start with and continues to be so for those who don't persist with it. But once you get to know it, the software reveals itself to be both robust and powerful.

Earlier this year, some Blender features could only be accessed by purchasing 'keys' from NaN, the software's publishers. This was to try and raise some badly-needed cash to develop version 2. Version 2 is now available and the keys are just a distant memory. I recommend all readers to go to NaN's revamped website at www.blender.nl, download the software, look at the tutorials and see what Simon Clarke is so excited about.

I will aim to look at Blender 2 in depth in the coming months.

CONTACTS

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Looking sharp

Tim Anderson on the best Windows development language and defaulting to 'My Documents'

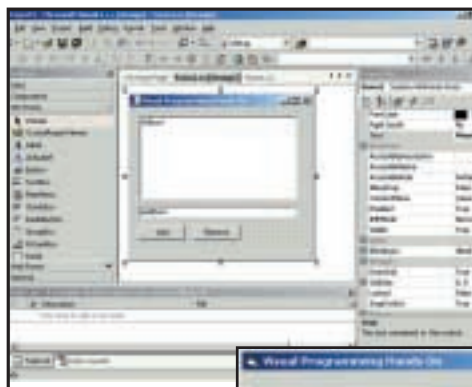
Microsoft's new language, C#, will soon be the language of choice for Windows development. This might seem a surprising view, given that it usually takes a long time to establish a new language and that even highly regarded examples, such as SmallTalk, have not succeeded in breaking out of their niche. Further, Microsoft's Visual J++ has not attracted many Windows developers, despite sporting a more elegant class library than either VB or VC++.

It will be different this time round. Visual J++ fell between two stools. Java developers disliked it because it came from Microsoft and because its primary class library, WFC, was not cross-platform. Windows developers found the performance of WFC poor in comparison to VB or MFC. Finally,

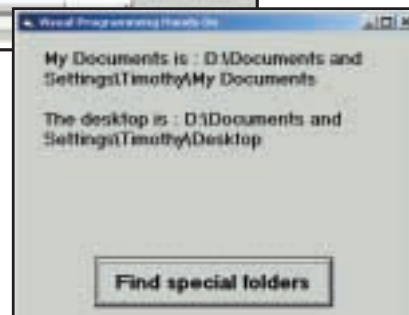
everyone doubted the future of Visual J++, bearing in mind Sun's control over Java and hostility towards Microsoft, doubts now justified by its apparent omission from the forthcoming Visual Studio.NET.

By contrast, C# has a lot going for it. It is a better language than VB, a more productive language than C++, and easy enough for ordinary mortals to learn and use. Microsoft's decision to use C# to implement the .NET framework – the new Windows class library – is a huge vote of confidence and means there are millions of lines of C# already written and compiled.

One of the key C# architects is Anders Hejlsberg, who was also a primary architect for Delphi, the Pascal environment consistently rated as the best Windows development tool. Delphi itself now looks dated because its language is not as deeply object-oriented as Java or C#. Delphi allows object-oriented programming, but also supports the old style of bunging lots of procedures into Pascal units. In C# almost everything is an object. Even



Left: Building the listbox application in Visual Studio.NET



Below: Retrieving special folders with the Windows API

FIG 1 Hello World in C#

```
// very simple program in C#
class Hello {
    public static void
Main() {
    System.Console.
WriteLine("Hello PCW");
}
}
```

(Key: ✓ code string continues)

FIG 2 The main part of the code for a C# listbox application

```
protected void cbAdd_Click(object sender, ✓
System.EventArgs e) {
    listBox1.Items.Add(textBox1.Text);
}

protected void cbRemove_Click(object sender, ✓
System.EventArgs e) {
    if (listBox1.SelectedIndex == -1) {
        lbStatus.Text = "Nothing selected";
    } else {
        listBox1.Items.Remove(listBox1.SelectedIndex);
        lbStatus.Text = "Removed one item";
    }
}
```

primitive types such as int can be treated as objects, for example with handy methods like toString(), although there is some trickery used to protect performance.

Figure 1 shows Hello World in C#: It looks similar to C or C++. Notice also that it is a class and not just a procedure. In C# all functions are methods. When an application runs, it starts with the static method Main. The static keyword means that the method is called without having to represent an object of that class.

Figure 2 shows a C# Windows application that has become a classic GUI example, using a Win Form, the Windows form designer in Visual Studio.NET. It includes a listbox, a text box, a status label and two buttons. Clicking Add will add the contents of the text box to the list. Clicking Remove will remove the selected line from the list box.

The IDE itself is a little different from the current Visual Studio. This is an Alpha release, so any of the details could change. The main working area is a tabbed web page, with a tab for the visual design surface and another for the code. To write code for the click event of a button, double-click the button to open the code editor. Alternatively, you can do



FIG 3 Finding special folders

```

Private Declare Function ✓
SHGetSpecialFolderPath Lib ✓
"shell32.dll" Alias ✓
"SHGetSpecialFolderPathA" ✓
(ByVal hwnd As Long, ByVal ✓
lpzPath As String, ByVal ✓
iFolder As Long, ByVal ✓
bCreate As Integer) As ✓
Integer
Private Declare Function ✓
SHGetFolderPath Lib ✓
"shfolder.dll" Alias ✓
"SHGetFolderPathA" (ByVal ✓
hwndowner As Long, ByVal ✓
nFolder As Long, ByVal ✓
htoken As Long, ByVal ✓
dwFlags As Long, ByVal ✓
lpzPath As String) As Long

Const MAX_PATH = 260
Const CSIDL_DESKTOP = &H0
Const CSIDL_PERSONAL = &H5
Const CSIDL_STARTUP = &H7
Const CSIDL_FAVORITES = &H6
Const CSIDL_RECENT = &H8
Const CSIDL_FONTS = &H14
Const SHGFP_TYPE_CURRENT = ✓
&H0

Sub GetSpecialFolders()
Dim iRetVal As Integer
Dim pos As Integer
Dim thepath As String

thepath = String$(MAX_PATH, ✓
" ")
iRetVal = SHGetSpecial ✓
FolderPath(0, thepath, ✓
CSIDL_PERSONAL, 0)

If iRetVal = 0 Then
'deal with the error here
Exit Sub
End If

pos = InStr(thepath, Chr(0))
'remove string after null
If pos > 0 Then
thepath = Left(thepath, pos ✓
- 1)
End If

Label1.Caption = "My ✓
Documents is : " + thepath ✓
+ vbCr

thepath = String$ ✓
(MAX_PATH, " ")
iRetVal = SHGetFolderPath ✓
(0, CSIDL_DESKTOP, 0, ✓
SHGFP_TYPE_CURRENT, thepath)

If iRetVal <> 0 Then
Exit Sub
End If

pos = InStr(thepath, Chr(0))
If pos > 0 Then
thepath = Left(thepath, pos ✓
- 1)
End If

Label1.Caption = ✓
Label1.Caption + "The ✓
desktop is: " + thepath
End Sub

```

(Key: ✓ code string continues)

everything in code. I was able to create a new button entirely in code at the planning stage, and it duly showed up on the form designer, demonstrating that you can work in whatever way you prefer.

The code for the Add and Remove Click events is shown in Figure 2. It is short and sweet and, although there is some more code to hook up the event handlers, this is done for you by the designer. In fact, there is nothing here that would cause problems for either a VB or VC++ developer. In the first method, there is a single call to the Add method of the Items collection of the Listbox, specified by familiar dot notation. In the second method, the code first inspects the SelectedIndex property of the listbox. If it is -1,

indicating that nothing is selected, a message appears. If there is a selection, a call to the Remove method deletes it.

Discovering My Documents

Rob Barnes asks: 'I want to be able to create a macro that defaults to My Documents each time. I've used C:\My Documents, but it won't work in Windows 2000 Professional.'

Rob has a very reasonable request, since official best practice involves saving user documents to 'My Documents', or better still a sub-directory of My Documents specific to your application. The application directory itself is best avoided, as many users like to separate application executables from their data for easier backup and restore. The

location of My Documents varies and 'C:\My Documents' is a poor choice because it does not allow for different users logging onto the same machine. The only reliable way to find it is to ask the system and surprisingly Visual Basic does not make it easy.

The answer is to use an API function. SHGetSpecialFolderPath will do the job, but is not available on Windows 95 or Windows NT4 unless the Internet Explorer 4.0 Desktop Update is installed. To overcome this, Microsoft has produced a redistributable library called ShFolder.dll which exports a function SHGetFolderPath. This lets you find the location of a number of special folders, including My Documents, Program Files, Windows and System directories. The best solution then is to distribute ShFolder.dll with your application and call SHGetFolderPath.

Figure 3 shows how it works. Both SHGetFolderPath and SHGetSpecialFolderPath identify the location you want with a CSIDL value, a hexadecimal constant. I could not find these listed with their values in MSDN, and Visual Basic's winapi.txt lacks any constants or declares for these functions, so instead I looked at the Visual C++ include file SHLOBJ.H. The code shows the values of a few of these. You can also see VB declarations for SHGetFolderPath and SHGetSpecialFolderPath. Dephi 5.0 users should add Shobj.pas to the Uses clause of any unit requiring these functions or constant values.

As with any API call, you need to take care when calling these functions from Visual Basic. It is vital to fill a string value with blanks, or to use a fixed-length string, before using it as a buffer in an API call. In this case the correct length is given by the API constant MAX_PATH, currently 260. On return, the buffer contains a null-terminated string, whereas VB strings can contain null characters. To unscramble it, chop it at the first null character.

CONTACTS

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For more information on C# and Visual Studio.NET visit: <http://msdn.microsoft.com/vstudio/nextgen>



On Phorum

Tim Anderson shows you how to set up an online discussion using PHP and Phorum

A popular feature of many successful websites is a discussion forum. If you have access to a website that supports MySQL and PHP – a popular combination on Linux and Unix web servers – then you can install Phorum, a set of PHP scripts written mainly by Brian Moon, which provide web-based discussions. Here is how to do it.

1 Check that you have the necessary software to run Phorum. It requires PHP 3.06 or higher (3.0.12 or higher recommended), MySQL 3.22 or higher and the Apache web server. These come as an option with most Linux distributions, so installation is likely to be straightforward. Then visit www.phorum.org and download the latest version, which at the time of writing is 3.1.2. Expand the archive somewhere within the directory where you store web pages. I used /usr/local/apache/htdocs/phorum on my Linux server. Now read the documentation, which includes a file security.txt explaining security issues. What follows assumes a server that has a public web server, but on which only you or trusted colleagues have FTP or TelNet access.

2 Create a directory outside the web pages area, for the configuration file forums.php. I used /usr/local/phorumconf. Give it read-write permissions for all users. Next, move the include sub-directory from the main phorum directory into phorumconf.

Now edit the file common.php, in the phorum directory. Find the line which sets inf_path, and amend it to point towards the configuration directory, for example:

```
$inf_path="/usr/local/
phorumconf/include";
```

(Key: ✓ code string continues)

3 The administration scripts in the Admin directory need to be accessible from the web but secured. The

following recommendation protects it both by obscurity and by password. Rename the directory to a name of your choice, such as myadmin, and rename index.php to something else, say myindex.php. Create a new, blank index.php. Edit common.php and change the variable \$admin_dir to the renamed admin directory, and \$admin_page to the renamed index.php.

Finally, set up password protection on this directory (a topic that was covered in this column in the June issue). There are also instructions for this in security.txt.

Phorum comes with some supplementary features in the scripts

footer.php. Additionally, use chmod to give write permissions to the web server for the files forums.php and forums.bak.php like this:

```
chmod 707 forums.php
chmod 706 forums.bak.php
```

5 Run the MySQL administrator and create a database. I called it phorumdb. You don't need to add any tables to the database, but you do need to grant permissions to the user that you want Phorum to use.

A smart move is to create a new user called 'phorum'. You can grant the new user permissions with the following command:

```
GRANT select,
insert, update,
create, alter,
delete, drop
ON phorumdb.*
TO phorum@
localhost
IDENTIFIED BY
'yourpassword';
```

6 You are now ready to configure Phorum through the browser. Browse to myindex.php

Screenshot 1



Screenshot 2



Top: Up and running in the browser. Use this page to configure database settings

Bottom: The main Phorum administration menu

directory. It is best to remove this from the website and treat it as a resource for the future.

4 Four key files are distributed in a generic form and need to be copied to a new name. Copy the following, found in the include directory: forums.php-dist to forums.php, forums.bak.php-dist to forums.bak.php, header.php-dist to header.php, footer.php-dist to

and don't be put off by the warning message that no database connection is available. Choose Phorum setup and then Database settings. You should see something similar to screenshot 1. Put in the correct information, click Update and again don't be put off that the connection is not yet established.

If at this stage you get other warnings, such as an inability to save settings, a common reason is permission or path name errors. The web server needs to be able to write to the include directory and also to the admin directory. Use `chmod` to fix permissions, and `common.php` to fix path names.

Some ISPs set up MySQL to use a default username and password for all connections, without any way for you to change it. In this case, you may well see a message: 'Warning: SQL Safe mode in effect'. To overcome this, edit `db/mysql.php` and remove the arguments to `mysql_pconnect()`.

Now go back to Phorum setup and choose Global settings. Here you can set the messages per page, the default email, whether cookies are used and how forums are sorted. The default email will appear as the moderator's email address in new forums, unless you override it. Cookies can be used to determine which posts are new when a user returns to a forum. Cookies are not essential to use Phorum.

7 All being well, you now have a screen like that in screenshot 2. The plumbing is complete and what remains is to set up your forums and to create a suitable welcome page. Phorum is able to handle multiple forums subdivided into folders, so the next step is to create a folder. Click New Folder and enter a name and a description. You can also control the colour scheme of the HTML table generated by Phorum. Click Add to create the folder and then Activate to make it active.

Now comes the good bit, where you get to create an actual forum. Go back to the main menu and then choose New Forum. Many of the fields are self-



Screenshot 3



Screenshot 4

explanatory, others are not. At a minimum, you need to complete the name, table name and moderator password. Folder, moderator email and password, messages per page, table width and table colours do exactly what you would expect. See below for more details of the other options. You can edit these later, so for now Add and Activate the forum.

8 The level of usage a forum attracts is greatly influenced by how it is presented. In the Phorum root directory, `index.php` provides a list of available forums. The intention is that you can make this the default page for the directory, so that users get to see this list. Although this is a start, it is not especially compelling. By checking out the links in `index.php`, you can create your own page that links straight into a forum. For example, links to:

`index.php?f=n`
will get you the folder numbered n. Links to:
`list.php?f=n`
will get you the forum numbered n.

Left: Setting the properties for a Phorum forum

Below: A typical web-based forum. This one is used for Phorum support and synchronises to a mailing list

The interface presented to the end user is easy to use and offers some good features. You can view topics as threaded or flat lists and search messages by author, subject, or for any word in the text (see screenshot 5).

Advanced Phorum features

Config Suffix is a customisation feature. When a forum page is generated, two files in the include directory, `header.php` and `footer.php`, are used to provide the top and bottom part of the page. If you fill in a Config Suffix, then you can create a custom `header_suffix.php` and `footer_suffix.php`. Edit these exactly as you want them for these particular forums. For example, you might enter a Config Suffix of 'pcw'. Now copy `header.php` to `header_pcw.php` and edit it to change the title of the page to 'PCW

Forum', or make more elaborate changes. This will now be used for all forums that have that suffix.

The suffix is also used for controlling bad posters and language. There are four files involved:

bad_names.php: contains names that are disallowed from posting.

bad_hosts.php: contains IP addresses that are disallowed from posting.

bad_emails.php: contains email addresses or domains that are disallowed. For example, you could enter `nastycompetitor.com` to prevent anyone posting with an email address at that domain.

sensor.php: contains words that you want to disallow. Note that only complete words count.

Realistically, none of these options is going to stop serious troublemakers, but they do put some obstacles in their way.

Moderation is a more powerful feature that can be set to Before posted or After posted. This means that all posts will be emailed to the moderator. Each post includes a URL through which you



can either edit or delete the posting. Note that while it may seem tempting to enforce strict moderation, if applied before posting it will slow down discussions and result in your forum being less well used. Unless you have strong reasons, moderation after posting makes more sense.

There are two fields for Mailing List address and Mailing List return. This is a neat feature that lets you integrate a forum with a mailing list. Entering an address here will make Phorum forward every post to a list. Entering a return address sets the reply address for such messages. There is also a script supplied with Phorum that lets you post messages via email. Overall, you can achieve reasonable integration between an online forum and a mailing list.

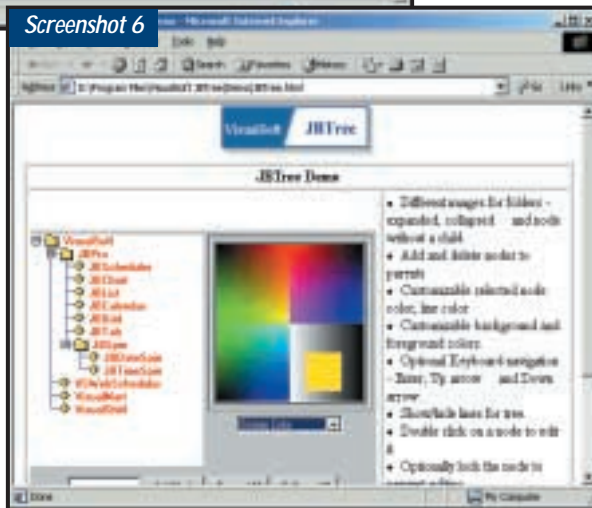
HTML options control the formatting that users are permitted to use. By default it is not allowed and all messages will be in plain text. You can permit any HTML codes, or else limit formatting to a few specified tags. If you allow HTML, users will have to enter the tags as they type, so it is not all that user-friendly. Moderators get full HTML in any case, so you can assert your authority as appropriate.

Evaluating Phorum

Phorum is an excellent product. It is free to use, platforms that support it are widely used and, crucially, it comes with full source so you can track down bugs or make your own modifications. Its biggest weakness is documentation, or rather the lack of it. Almost the only thing available is a terse readme.txt, although the support forum at the Phorum website is a good searchable resource. You can adapt Phorum to use databases other than MySQL. A script for PostgreSQL is supplied, with others such as SQL Server available on request.

Some people are snooty about web-based discussion boards, mainly because they tend to be clunky compared to newsgroups. This is not surprising, given that newsgroup technology and clients are dedicated to threaded discussions, whereas the web is not.

On the other hand, less technical users who have not got to grips with



Top: The Phorum search screen, with a good range of common-sense options

Bottom: One of a number of Java components in the VisualSoft JPro suite

newsgroups will find a web board easier to use. Phorum is built on a database, which gives it good scalability. You can easily set up internal newsgroups, but getting an ISP to support private newsgroups is harder and will cost more than a Phorum solution.

If you use Active Server Pages, you will find similar products available, although not at the same price. Videosoft's VSForum, now at version 2.0, is also built on a database, using ActiveX Data Objects to drive data held in either Access or SQL Server. In terms of features, there is little to distinguish between them, although the documentation for VSForum is far superior.

VisualSoft WebDev

Web development is well suited to the use of components to add tested

functionality to a website. Whereas in Windows development, most components are visual, many web components are non-visual, server components that perform a specialist task such as validating credit card numbers. The VisualSoft WebDev suite combines both visual and non-visual types. Visual components are implemented as Java code, which you can use as applets or embed in a Java application. The themes are familiar, including JList, JTree, JBCalendar and so on, but the implementations are of high quality.

For the server, WebDev components are based on COM, which means they are for use on Windows, primarily Internet Information Server and Active Server Pages. There are components for FTP, Mail, currency conversion, encryption, file upload and many more.

The WebDev suite is presented in a smart booklet with a CD containing all the products in demonstration form, from which you can purchase individual components or complete suites. There are three suite

packages. WebDev itself covers FTP, HTTP, Mail, File Upload and a calendar. JPro is a range of visual Java components. ViseCOMM is a collection of ecommerce components.

CONTACTS

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The site for all things Phorum is www.phorum.org. You can also find the example used for this tutorial at www.itwriting.com/pcw/phorum

Find VSForum (£350-£411.25 inc VAT) and WebDev Suite (various prices) at www.contemporary.co.uk
Tel 01392 262 626



Can I help you?

If you need help with a shopping system, Nigel Whitfield suggests asking for the Shop@assistant

Before diving back into our look at configuring shopping systems, I'm going to digress briefly into security – something that has recently featured heavily in the news with banks and power companies managing some spectacular cock-ups. While you might reasonably expect such large companies to employ a penetration tester to check the integrity of their sites, for your own site you'll probably have to check things yourself.

That means checking, and checking again – and try obvious things. One of the recently publicised problems appears to have been a result of storing private files in a web directory – something many of us may have done. If you really can't avoid doing this, check the access controls on your web server. If you have a single file in a directory called, for example, search.html, what happens when someone deletes the name of the file from the end of the URL? Are they going to see a list of the files in that directory? If they can, you've been sloppy. Make sure there's a properly named index file, such as index.html, or alternatively turn off automatic indexing of directories, using the .htaccess file or Directory directives on your web server.

There are plenty of other obvious things to try. But make sure you do try them, and don't fall into the same sorts of problems as some of the big boys. A real attack on your server may be difficult to stop, but there's really no excuse for leaving important information exposed by sheer sloppiness.

Shop@ssistance

Last month I started looking at the MiniVend package (screenshot 1) for



Screenshot 1

Left: MiniVend offers more control, but is more tricky to set up

Below: You can get hold of Shop@assistant from www.floyd.co.uk. If ease of use is more important to you than total control over the shopping element of your site, it could be just the ticket



Screenshot 2

people who want a high degree of control over how their shopping site works. We'll be returning to it in more detail over the coming months, looking at the different options and various ways of getting the most out of the system.

For some people, however, MiniVend will certainly be overkill – not to mention rather more complicated to set up than is necessary.

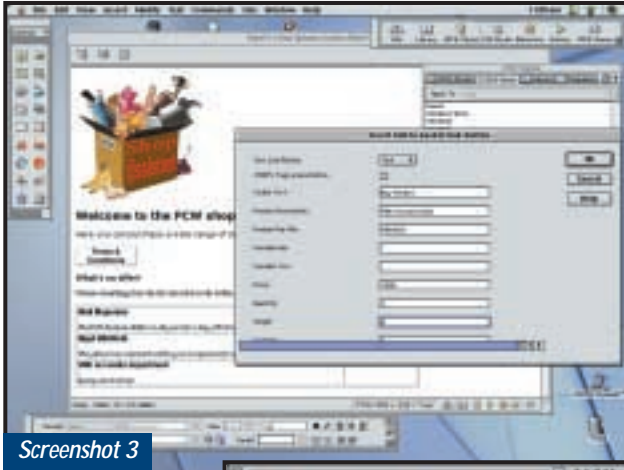
One of the systems that's frequently promoted as being both simple and straightforward to use is Shop@assistant (screenshot 2), which you can get from The Floyd Consultancy (www.floyd.co.uk). It's available for both PC and Macintosh, and works by creating a shopping basket with JavaScript. You can use it with a simple form mail script to provide a system for ordering without credit cards, or with secure payment systems.

In short, for a lot of people, it should be straightforward to get to grips with. At least, that's the theory. In practice, how do you get started? I've been playing with the Mac version, which is essentially pretty much the same as the PC version, but with a Mac installer. Shop@assistant is, after all, largely a collection of .htm files containing JavaScript. There are also some extras, including Object files that can be used with Macromedia Dreamweaver, which makes setting up your shop incredibly simple.

However, on installation, it might not appear quite the case. First, you need to manually drag the Dreamweaver files to the Configuration\Objects directory for your installation. Next, you'll probably find that you have a lot of strange files in the Shop@assistant folder on your hard drive. There will be a demo site and a blank site.

If you want to create a site from scratch, then probably the best thing to do is to start with the blank site folder – and make a copy of it beforehand in case you accidentally break any of the JavaScripts. So, how does this all work?

In the blank site folder, which you can rename to anything else you like, there's an index.html file, as well as robots.txt, and three subdirectories, called pages, pix and system. The index.html is the start page for your shopping area. It loads the JavaScript shopping basket and sets up an invisible frameset that then



Screenshot 3

Left: Setting up your Shop@ssistant shop is as simple as choosing the Add to Basket object from Dreamweaver's Insert menu

Below: The Shop@ssistant scripts automatically generate the basket page for you, based on options in the configuration files

of JavaScript for each buy button, or to take people to their shopping basket.

By using the plug-ins for Dreamweaver (they're also available for NetObjects Fusion), you can make your site extremely easily. As screenshot 3 shows, it's a fairly simple matter of choosing Add to Basket from the Insert menu and filling in a brief description of the item, including price and weight. You can have either a text link, or a button on the page if you prefer; screenshot 4 shows a sample page we created.

Add a Review basket button in the same way and you have a basic shop.

Shop@ssistant takes care of everything else, as long as you've configured it properly. The Add to Basket and Review Basket links take visitors to their shopping basket, where they can remove items, or proceed to the checkout. All those pages are created using the information you entered into the configuration files.

Of course, you can edit some of the files to change

loads the file pages/index.html.

You can edit this first page if you like, as long as the script in the head of the page isn't changed. Once it's loaded, if the browser that's being used to visit the site is compatible, the scripts from the system directory will be loaded, setting up the frameset and loading pages/index.html.

Before you can get that far, however, you'll need to edit some of the .htm files in the system directory, which you can do using your favourite HTML editor, or just a text editor. You'll need to pay careful attention to the notes in the manual and make sure that you change everything – the defaults have fake information rather than blanks in them.

The best place to start is the usersvars.htm file, which is where you specify the name of the company, email address and other basic information. The tax.htm file is for VAT information, while of_pay_sass.htm contains details of some of the payment methods, including bank details for people who want to pay by direct transfer. Other files contain details of the credit card payment solution you are using – and here it is absolutely essential to read all the documentation very carefully.

You'll need to edit file_defcs_sass.htm, which lets you specify shipping options,

using your choice of the files supplied, so you can opt for Royal Mail, DHL, or other shippers – you could even modify the files to cater for a different courier service if you like. This is also where you can specify the mail script that's used to submit orders.

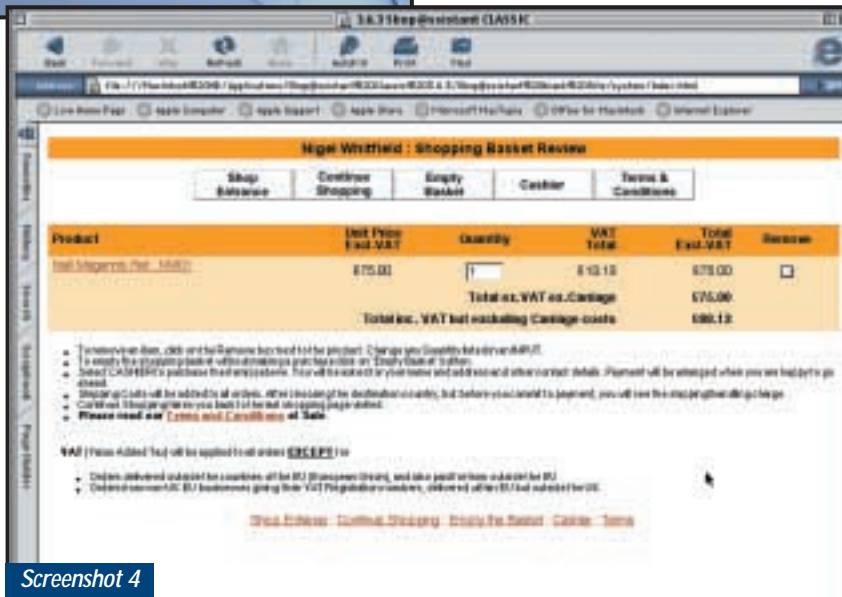
Once all the setup is done – and although it sounds quite fiddly, it didn't take any more than half an hour for a site using bank transfer or cheque payments, rather than credit cards – you're ready to start creating your own shop, with files in the pages directory.

One of the beauties of the Shop@ssistant system is that it doesn't tie you into having your pages look a particular way. You could just have a single-page shop, solely using the file pages/index.html to list all your products, with a 'buy' button next to each one. Or you could have sub-sections, with a page for each product, or combinations. All you need is a little bit

the look and feel of the shopping basket and checkout pages – we'll cover those in a later issue.

But there you have it in a nutshell. Provided you invest the time to create the site settings, you can build a shop with a single page. Point people to the top level index.html to load the JavaScripts and Shop@ssistant will do most of the rest.

As always, the tricky part will be setting up your secure payment system with a credit card processor – of which more another time – along with some alternative ways of taking payments from users, including micro-billing via Windows Dial-up Networking.



Screenshot 4

CONTACTS

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Pop goes the mobile

In our new expanded column, Simon Rockman looks at using email on the latest mobile phones

Mobile phone hardware has finally caught up with the PDA. If you want to read email on the move, the setup of a phone with infra-red and a Palm or Psion 5 has been around for a couple of years. At the time it seemed amazing that you could log in and pick up your mail with two boxes each weighing a total of 400g. PCW weighs about three times that.

Two years is a long time in the mobile phone world and today you can do the same thing with a single device weighing under 100g. There are two mobiles available with the ability to read POP3 email; the Sony CMD-Z5 and the Panasonic GD92. More phones are pending, including the Benetton Q.

The Sony has caused quite a stir, it's the way of the future, although without any

external access to its modem (it's got no infra-red port and the cable solution only works with a PC) it won't be the first choice for PDA owners.

The CMD-Z5 is a wonderfully elegant phone and includes the Microsoft Mobile Explorer browser.

This means it will read HTML as well as WAP pages.

Microsoft is playing politics here. It argues that HTML is an established standard and WAP is an upstart, and as a result there is a vast amount of HTML information and precious little WAP. Although this much is true, where it all falls down is when you try to view an HTML page on Microsoft's Mobile Explorer browser.

The Sony screen can only display 96 x 72 pixels. WAP, of course,

can adapt the layout of its content to fit this size of screen, whereas HTML can't. It's not just the screen that's restrictive, GSM bandwidth at 9,600bits/sec is also a constraining factor. The Internet is slow enough at 56K, but at 9,600bits/sec it's torture, especially when you have to download lots of data that you're going to throw away.

WAP content is designed from the start for mobile devices. It has to be: most phones, the Sony included, only have a small cache – a couple of KB at the most. The result is that, to use the HTML features of the Sony phone, you really need specially created pages and that's a non-starter. You can surf the odd non-specially created HTML page, but it has to be very, very plain HTML.

The WAP features of the Sony phone are fine, although some of the implementation is a little strange. Part of the way WAP works is to rely on the text-input gadgets in the OS of the phone. When you need to enter details of the name of the film you want to see, the share you want to check or whatever, the phone uses its own input routine.

This is a sensible approach, since it lets you use the predictive text, handwriting recognition or whatever shortcuts the phone has for text entry. The way the CMD-Z5 does this is with a



These latest mobiles from Panasonic and Sony are the first of a new breed that allow you to read email from POP3 accounts

Mobile data gets the high-speed treatment

Orange and BT Cellnet have launched their high-speed mobile data services. Both use aggregation of GSM timeslots – one timeslot is usually the equivalent of a single GSM call.

The Orange service uses a technique called HSCSD (High Speed Circuit Switched Data). This aggregates two slots to give either 19.2Kbits/sec or 28.8Kbits/sec depending on line quality and the compression used. At the moment, the only device that supports this is the Nokia Cardphone 2.0 (pictured), a PC

Card that plugs into a PC or Mac. The Nokia 6210 and Ericsson T36 phones, which are both supposed to appear by the end of the year, will also support HSCSD.

The BT Cellnet service uses a more advanced technology called GPRS (General Packet Radio Service). This uses up to eight timeslots, but does not tie up each slot for the duration of a data session. Instead it only calls the bandwidth into action when data is being sent or received. At lull periods in a session, the network will reallocate unused

bandwidth to other data users or to voice calls. Since all the timeslots on the network are shared and voice callers can take back whole slots, leaving the GPRS users to use the others, it's a very efficient use of resources – and a lot like the CDMA system used in the US which, incidentally, will be the basis for third-generation mobile networks.

Unfortunately, the initial launch is restricted geographically to the south east, but excludes London, and is only available commercially to a few large corporate customers.





text box that looks as though you can type straight into it. Rather annoyingly, you can't.

Also, WAP has a `<\button>` command. This defines what appears on the softkeys of the phone. Some phones have three, some two, some one and some none. WAP site developers cannot be expected to know what the phones of the future will have, and different phones will take a different approach to implementing the command.

The Nokia 7110 is the *de facto* standard and has two buttons below the screen. Other phones use a menu system. If there are no soft keys, or the site needs more than you have, pop back to the menu and you'll find the option there. It's not as intuitive as using a PC, but then phones don't have a mouse or touchscreen.

Site developers haven't had to worry about where they put the buttons command in their page (or 'card' in WAPspeak) because the phone has always tidied it away to the correct key or menu. The Microsoft/Sony implementation upsets this. By taking the standard literally and not understanding how other phones work, the browser draws a button on the screen. This is a wonderfully flexible approach; you can have as many buttons as you like and it's much more intuitive than going off to another menu. However, on a lot of WAP sites the result will be a very different screen to that which the site builder had in mind.

I've got a cupboard full of phones, but it's the Sony I use and recommend to friends

Despite these niggles, I really love the Sony. I've got a cupboard full of phones from a variety of manufacturers, but it's the Sony I use and that I recommend to friends. It is the phone of the moment, but it does show that WAP as a standard is still maturing.

The second phone of the month is the Panasonic GD92. Phones with high-end facilities such as email are usually launched at a high price and then filter down to the budget end. At around £80, the Panasonic will be introduced at about half the price of the Sony. What's impressive is that Panasonic

New faces of Palm readers



Right: Virgin has launched a branded version of the new Palm m100, the Virgin m100. For the same price as the Palm version, you get a couple of extra clip-on covers and a suite of communications software, which Palm will be selling for £50. It's available in the same Virgin and Our Price stores as Virgin mobile phones.



Left: Cambridge consultancy Ubinetics has produced neat little cradle for the Palm V. This roughly doubles the thickness of the device and turns it into a GSM phone.

You get full Internet access with a big screen on a device that still fits in a shirt pocket – surely the best of all possible worlds.

realises that email isn't just for the besuited, it's part of everyday life for everyone who is too young to remember Abba the first time round.

This phone doesn't just have email, it also has recordable ring tones, which can be individually set for different callers. The backlight can be set to one of four colours, again depending on who is calling and a graphic on the screen can be chosen to reinforce this.

The GD92 doesn't have a WAP browser, only POP3 email support. But, nevertheless, it is the final step in making email a lifestyle feature. And the most incredible aspect of this is the weight of

email using one of two different kinds of service. You can have a mail account with one of the email-to-WAP services. This means that you have to have a second email address specifically for your mobile, and you'll have to give out your mobile address to anyone who wants to mail you while you're out and about.

Alternatively, you can use one of the WAP services that picks up your mail from your existing POP3 mailbox. The problem with this solution is that it means telling the service what your POP3 password is so that it can log in and get your mail. This is fine if it's just your personal address, but if you work in a big company, this is likely to spook the data security people to the extent that they'll probably revoke your ability to dial in to access your mail box.

A phone that does the logging in and retrieving of mail all by itself is a much neater and more secure way of doing things. It's also likely to be more reliable, as data that goes from your mailbox to a WAP site and then through a WAP gateway is travelling through so many machines that there is bound to be a broken link in the chain at some stage.

the phone. It's amazing that everything you need to receive email on the move will fit into a neat little package that weighs just 77g.

With both the Sony and the Panasonic you'll need to understand how to set up the phones to receive mail by telling them what SMTP or DNS server they need to use, but that's no different to configuring Outlook or Eudora on a PC.

Of course, you don't have to have a POP3-capable phone to get email, there are now around a dozen models of WAP phone and they can all be used to read

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A connection shared...

Roger Gann looks at the bigger picture on Internet access for users on a small network

Large companies have been doing it for years: they use a single LAN connection to distribute Internet access among dozens or even hundreds of PCs. The hardware isn't cheap and it's not easy to set up, but the unit cost becomes very affordable when you spread the investment across many workers. Sadly, this solution doesn't scale down for smaller businesses or branch offices and so for a long time they've accessed the Internet on a 'one modem per PC' basis.

But times are changing and these days there's a good range of low-cost, easy-to-set-up solutions for the small business that make it easy to

share Internet access among a group of networked PCs. They all work in different ways but the bottom line is that they all let several networked PCs share a single Internet connection, be it standard dial-up modem or ISDN. The only caveat is that all the machines be connected with a LAN and have to be running TCP/IP. This doesn't have to be a heavyweight client/server solution either – the simple peer networking that comes as standard

You only need a single phone line (analog or digital) to service the connection, so you can save on line rental. You only need one ISP account, too, which as well as being cheaper, also makes it easier to manage.

And the user experience is better – if you go down the ISDN router or proxy server route, users no longer have to explicitly initiate an Internet

modem. Now, whenever a user wants to connect, they simply fire up an Internet app and the proxy server will look to see if the data requested is already cached on the server. If it is, it's served up without making a call, if it isn't, the proxy server then makes the connection without any further user intervention. Once up, other users on the network can then use the connection. We looked at setting up Internet Connection Sharing, the proxy supplied with

Windows 98 SE back in the March column.

The final solution is the ISDN router. This device sits on the network and every time a packet is detected with a destination outside

the network, it'll initiate a connection, usually in just two or three seconds. Once again, when the connection is up, it can be shared. The beauty of this solution is that SME ISDN routers are generally easy to install and get up and running.

The SME router

Without a doubt, the most attractive solution to this problem is the SOHO ISDN router, often referred to, somewhat incorrectly, as a 'LAN modem'. This kind of product combines the speed of ISDN with an IP router. The newest and most popular ones also include a small Ethernet hub to help you get a handful of PCs networked as well as connected, so they're a one-stop small-office connectivity solution. This WAN-in-a-box is a simple solution that takes most of the fear out of remote access. Out of the box, you are not only provided with a local network, but also a fast connection to the Internet for all your attached PCs. Now everyone can check email or surf the web without going through the purgatory of maintaining multiple modems and phone lines. And if the corporate LAN is on the Internet, you



Routers allow you to share a single Internet connection between multiple staff

connection, all they have to do is fire up an Internet application and the connection will be made for them. And if you want to limit or control access to the Internet, these solutions often allow you to limit connection times, some even let you limit access to sites with 'questionable' material.

There are basically three ways of achieving this SME Internet nirvana. You can use modem-sharing software to

You can limit connection times or even limit access to sites with 'questionable' material

with Windows 9x is more than adequate and no dedicated server is required.

The benefits of such an arrangement are fairly obvious. Having a single connection makes Internet access so much more controllable and efficient – you can eliminate the complexity and expense of maintaining multiple phone lines, modems and user accounts for each individual connection under conventional schemes.

share a single modem, or ISDN Terminal Adaptor (TA), between several users. This is cheap, lets you use existing kit and will free up phone lines. However, users will still have to manually initiate an Internet connection. And, generally, it isn't shared – once a connection is made, other users on the network can't access the Internet.

The second method takes the first one a stage further and puts proxy server software between the users and the



can connect to it via your local ISP and extend the network to wherever you are. Or connect directly via the ISDN line.

Good though this solution is, it does, of course, require ISDN and not every branch office has ISDN. Luckily it's inexpensive to install and so this shouldn't pose any real problems.

There's a good range of SME routers to choose from.

Here's the pick of the bunch:

3Com

OfficeConnect
ISDN LAN Modem

www.3com.com/products/dsheets/400396.html;

Bay NetGear RT338 www.netgear.com/products/routerhome.shtml;

Cisco 766 www.cisco.com/warp/public/cc/pd/rt/700/;

Eicon DIVA ISDN LAN Modem www.eicon.com/divalan/default.htm;

Ramp NetWorks WebRamp 410i www.rampnet.com/products/410i/index.html.

Once upon a time, installing a router required the presence of a bearded, sandal-wearing, pipe-smoking Unix guru. The current crop of low-end routers are aimed at the non-technical user and are very (and I do mean VERY) easy to configure – no word of a lie, they can be up and running in just a few minutes. All they require is that your PCs (or Macs or Unix boxes) have network cards installed and that they're running TCP/IP and set to pick up their IP address from a DHCP server. You then plug the network cables into the Ethernet ports on the hub portion of the router and into each network interface card. The PCs automatically pull an IP address and

name and password), at the end of which it tests the connection to make sure it works. Thereafter, connecting to the Internet involves no more effort than double-clicking on a browser icon. It's truly a 'fit and forget' Internet connection solution.



Above: 3Com's OfficeConnect is one of a range of SME routers available

Below: Terminal adaptors are an option but routers are faster

For an overall cost of around £300 an ISDN router combination certainly gives a lot of bang for your buck.

The benefits are that it offers transparent, fast access for all users to the network; it can use a cheap, dial-up account; it can also connect direct to a head office LAN via ISDN; it's platform-independent and works with anything running TCP/IP. Plus, it's easy to set up.

However, there are some negatives to bear in mind. Familiarity breeds contempt and users can run up huge phone bills now that Internet access is so quick and easy. More expensive routers allow you to put quite tough tariff-management schemes in place



TA versus router

Assuming you've gone down the ISDN route you could equip every PC with a TA, after all they're now pretty cheap. So why use a router? A major reason is the speed of connection, which is very fast with a router. An analog modem takes about 30 seconds to

connect to an ISP using Dial-Up Networking. This is cut to

about 10-15 seconds with an ISDN TA. However, an ISDN router takes just a couple of seconds to connect, so fast that it gives the impression that you're permanently connected. Another good reason to use a router is better time-out control. Routers

connect and disconnect automatically, based on whether data has to move across the ISDN line. If you've ever walked away from your PC and unintentionally left your TA connected to your ISP (48 hours is my record!), you'll know why this is important. Third, since

routers communicate with PCs via Ethernet, they aren't constrained by the 115.2Kbits/sec limitation of the PC's serial port, as are all external and many internal ISDN adaptors. True, you'll need an Ethernet card in your PC to connect to the router, but a decent 10BaseT card can be bought for less than £20. Finally, small-office LANs are becoming more common and while it's not impossible to share an ISDN TA among several PCs, a hub/router combo makes the task so much easier.

OK, that's enough for this month – next month in the concluding part of this overview of LAN access, I'll be looking at choosing a router, the benefits of ISDN over ADSL and the benefits of Network Address Translation (NAT).

Installing a router required a bearded, sandal-wearing, pipe-smoking Unix guru

other TCP/IP configuration details from the DHCP server on the router.

The next step is to configure the router. This used to be the hard part, but not any more. Most are miniature web servers so you fire up a web browser and point it at the router (which is usually at 192.168.1.1). A web-based wizard then steps you through the task of entering your ISP details (phone number, user

to control usage, a feature the cheaper routers lack. So, the phone bills ought to be watched – opt for fully detailed bills and consider going for the reduced unit cost option from your telecoms supplier, which cuts the minimum call charge. For example, with my supplier this is cut from 4.2p to 2.5p. This can save money, as routers tend to make loads of really short calls.

CONTACTS

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KEEP RECORDS

When you phone a supplier, make a note of the name of the person you speak to, and when. Note down any claims they make for the product in which you are interested, or any specifications they mention. If you are unsure that what they are offering is right for the task, then ask.

GET A FULL SPEC OF THE MACHINE

Before you place an order for a machine, insist on being faxed or emailed a full specification, detailing all components and peripherals. Check what is included: for example, when buying a printer, are all cables and cartridges bundled? If you've used a review in a magazine to guide your decision, make sure that what is quoted matches what you have read. Sometimes, machine specifications can change from the model sent for review.

BE CLEAR ABOUT SUPPORT AND WARRANTIES

Make sure that you get a warranty that suits your needs and is fully detailed in the quotation. If you need swift repairs, consider paying extra for an eight-hour repair service. Also make sure you understand the level of service you can expect to receive, including who pays for couriers if your machine has to be returned for repair.

USE CREDIT CARD PROTECTION

When you place your order, use a credit card. The Consumer Credit Act ensures that credit card purchases between £100 and £30,000 are covered. Check the address to which the goods will be sent. Often, if you buy with a credit card you can only receive the goods at the address on the card. If you are buying over the Internet, make sure you are using a secure server, sometimes denoted by the prefix 'https'.

SET DELIVERY DATE AND CHECK WHAT IS DELIVERED

This gives you some comeback if the goods are not delivered on time. When the goods arrive, check the packaging before you sign for them, to guard against damage in transit.

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Accessible Access 2000

Written by Hands On columnist Mark Whitehorn and Bill Marklyn (development manager for the first two major releases of Access), this book assumes you have no knowledge of Access or databases and takes you to the point where you can create and use a multi-table database.

Authors: Mark Whitehorn, Bill Marklyn;
318pp plus CD-ROM
RRP £24.50

PCW reader price £22

PCW subscriber price £19.50

ORDER REF AA20



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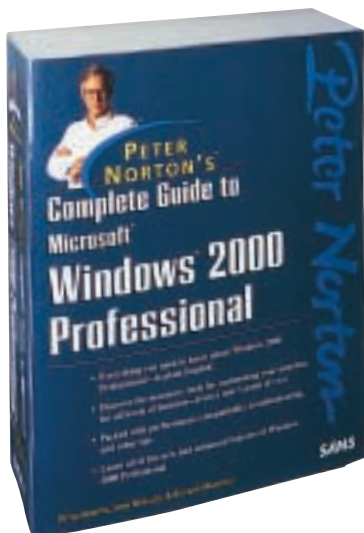
This is the 11th edition of the definitive PC hardware book, which has sold more than 1.7 million copies worldwide and is trusted by more people than any other book of its kind. The bundled CD-ROM includes editions of PartitionMagic and Drive Image.

Author: Scott Mueller; 1,628pp plus CD-ROM
RRP £39.99

PCW reader price £35

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Peter Norton's Complete Guide to Microsoft Windows 2000 Professional

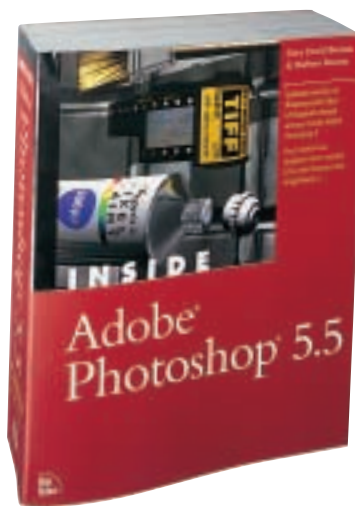
This book follows the comprehensive, user-friendly and highly acclaimed Norton style. Its unique, hands-on, step-by-step approach teaches the features of Windows 2000 Professional.

Authors: Peter Norton, John Mueller and Richard Mansfield; 1,628pp
RRP £28.99

PCW reader price £26

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Inside Adobe Photoshop 5.5

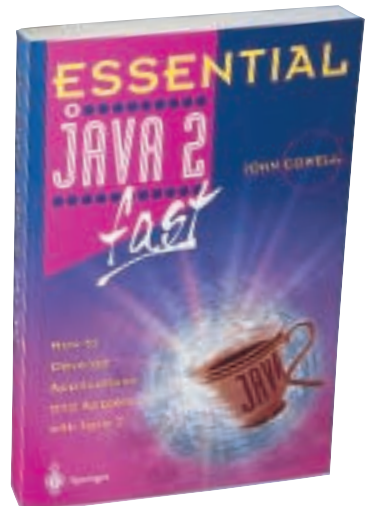
See for yourself why Gary Bouton continues to earn the loyalty and dedication of Photoshop users. Whether you're a professional or a hobbyist, after working with Inside Adobe Photoshop 5.5, you'll walk away with the skills needed to accomplish fantastic, advanced image manipulation.

Authors: Gary David Bouton and Barbara Bouton; 888pp plus CD-ROM
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Essential Java 2 Fast

A complete introduction to Java 2, this book will show you how to take advantage of Java 2's new features (such as the abstract windowing toolkit and the swing classes) for creating graphical user interfaces. It is designed for professional developers or students who need to learn the maximum in the minimum time.

Author: John Cowell; 256pp
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Alice

Lara Croft's days on top are numbered if the curiously named American McGee has his way. One of the designers behind Doom, McGee has now set his fevered imagination about re-inventing Alice in Wonderland, and this time our heroine isn't taking any nonsense.

Finding herself summoned back to a nightmarish Wonderland, which is now under the less-than-sane control of the Queen of Hearts, Alice must tackle a selection of fierce creatures and fiendish puzzles to return the dreamland to its former state of abnormality.

The game, based upon the Quake III engine, unfolds across 15 levels through a variety of darkly surreal locations, while giving Alice 30 characters with whom to interact. These range from the familiar White Rabbit and Mad Hatter to mutant Playing Cards and other creatures from the Lewis Carroll stable. The Cheshire Cat also 'appears' with helpful advice.

Alice has an array of special moves to complement her conventional jumping,



running, walking and climbing, and in order to progress through Wonderland she also has to change size. Sometimes she'll tower over other characters and at others she'll be on fighting terms with ants. In keeping with this meaner, leaner Alice she has an arsenal of weird weapons ranging from Demon Dice and Jack-in-the-Box Bombs to playing cards that slice their victims in half when thrown.

If 3D action games are your thing this will be worth a look, even if it's likely to have Mr Carroll spinning in his grave.

www.alice.ea.com/main.html

ANDY STEWART

Starship Troopers

Hasbro Interactive has plundered both the 1997 action film and Robert Heinlein's 1957 novel to produce real-time strategy game Starship Troopers: Terran Ascendancy. Following a linear plot of 20 missions, you command a squad of Mobile Infantry dropped onto the surfaces of a succession of bug-infested planets.

Although it resembles other recent RTS releases, such as Force Commander, the game is based on a 3D engine, designed by Australian developers Blue Tongue, to handle large expanses of action as Arachnid hordes come up against the Starship Troopers. The game also supports the transform and lighting features of nVidia's GeForce graphics cards. This comes to the fore in a



number of the game's night-time scenarios, where each trooper illuminates the area in front of them with their own helmet-mounted lights.

As you complete each mission your squad becomes more and more skilled, but should you lose any of your team

they are replaced by a raw recruit. Your troops can be kitted out with hardware ranging from flamethrowers to tactical nuclear missiles.

Without the need to accumulate resources, the game allows you to focus on each mission and how to control your squad, such as setting the aggression level of your troops depending on how proactively you want them to engage the bugs. A number of specialist troops are also available to give you an edge. Psychics, for instance, while not being the best fighters, can detect bugs burrowing beneath your squad and control the mind of a bug to turn it against its own kind.

www.bluetongue.com

ANDY STEWART

Sydney 2000

The thrills and spills of the Olympics comes to your desktop with this well-timed release

With the Olympic games now under way, Eidos and developer Attention to Detail (ATD), have joined forces with the International Olympic Committee (IOC) to bring us Sydney 2000, the official video game of the Olympics. It's taken over two years to develop and is the first product of an exclusive six-year agreement with International Sports Multimedia (ISM) to publish video games under licence from the IOC.

Like many other PC games, the lengthy development time is a consequence of research by a team of 30 coders, designers, testers and others at ATD. This research involved using motion-capture techniques where the actual body movements of athletes from each discipline were recorded and translated onto wire frames. This results in impressively realistic motion and some of the gestures from the competitors will amuse – especially the weight-lifters. To further enhance the experience, the colours and textures of the Olympic stadium have been recreated right down to the tiles in the swimming pool and the precise hue of the grass on the field. In addition, real sports commentators describe the action, while a multitude of camera angles and recorded sounds add to the atmosphere of the games.

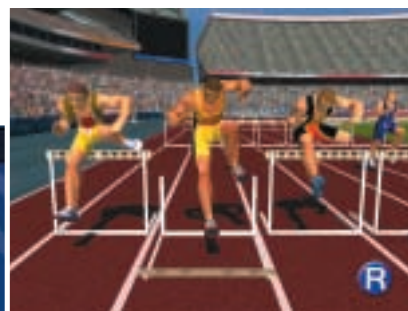
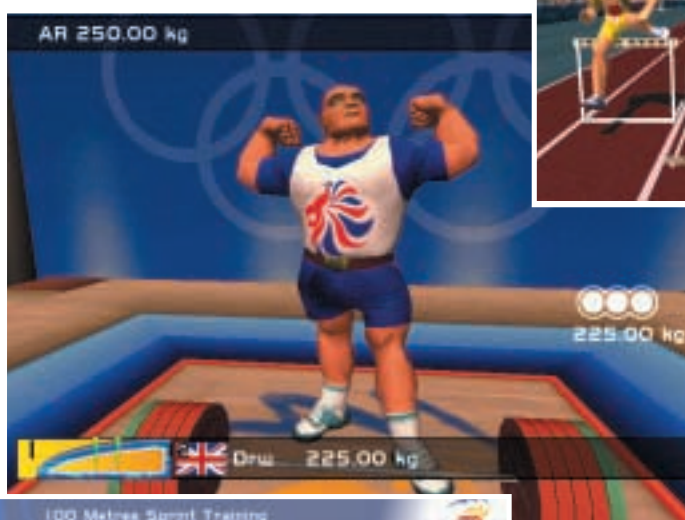
Graphics-wise, the wire-frame motion captures are a bit blocky, but they do run smoothly on a system using a TNT2-based graphics card at 1,024 x 768 with 16bit colour, a 400MHz CPU and 64MB of memory. Detail, although not earth shattering, is reasonable with shadows in all the right places together with lens flares as the camera points to the sky.

Moving on to gameplay, Sydney 2000 includes 12 events; the 100m sprint, 110m hurdles, hammer, javelin, 100m freestyle swimming, skeet shooting, Olympic sprint cycling, super-

heavyweight weight lifting, triple jump, 10m platform diving, high jump, and Kayak K1 slalom.

Players also have 32 countries and five levels of difficulty to choose from, as well as three modes of play – Olympic, Arcade and Coaching. Olympic mode allows you to train up a squad of athletes in the virtual gym to a standard fit for the Gold medal. Arcade mode is a

javelin is released); and directional controls for manoeuvring the Kayak or aiming the shotgun. For those who have fond memories of manic button thrashing in Daley Thompson's Decathlon and Track and Field, then



Sydney 2000 will definitely bring a smile. It's a great blend of the power of modern graphics with the fun of video arcade games of old.

A multiplayer option is available, but is limited in that some disciplines are

individual events. Play is also not supported over a LAN or the Internet, something we feel is a shame considering that the spirit of the real Olympics is all about bringing together the nations of the world through friendly competition.

Overall, some may find the gameplay a little crude, but this is not what Sydney 2000 is about. It is about capturing the sweat, hard work and sheer enjoyment of the Olympiad, and this game delivers in spades. And the best news is that we've got five copies up for grabs in or competition on page 486.

JALAL WERFALLI

points-based game, with competitors taking part in the final of each of the selected events. In Coaching mode you, as an individual, have the opportunity to build up your physical strength and stamina, and even your mental fortitude – all of these have an effect on performance and your appearance.

Sydney 2000 takes a cunning step backwards where the controls of the game are concerned. These comprise only two power buttons, alternatively pressed to produce speed or power; an action button to instigate a particular task (for instance, the angle at which the

DETAILS

★★★★

PRICE £34.99 inc VAT

CONTACT Eidos Interactive 020 8636 3000

www.eidos.com

SYSTEM REQUIREMENTS Pentium II 266 (Pentium III/AMD Athlon recommended); 32MB of RAM (128MB recommended); 3D accelerated DirectX v7.0a-compatible graphics card; DirectX v7.0a-compatible sound card

Carmageddon: TDR 2000

Race for your life or complete missions to stay alive – the choice is yours in The Death Race

A classic game can easily be destroyed by taking it a sequel too far. One way to get around this is by broadening the game's original approach to maintain interest and increase audience appeal. Carmageddon: The Death Race 2000 uses this strategy successfully thanks to intelligent, subtle tweaks to the gameplay and an impressive overhaul of the game engine.

In 1997 the gloriously simple, mindless entertainment that is Carmageddon was unleashed on the world. Its strength was appealing to the destructive adolescent within every man and woman. We may act maturely and responsibly, but any number of frustrated city-centre drivers have fantasised about scoring points by wiping out sluggish pedestrians.

Carmageddon was the racing game without rules where you were actively encouraged to perpetrate maximum havoc. A year later and Carmageddon 2 was released with more cars and tracks, but by this time the game engine was beginning to look dated. It did not take advantage of the latest 3D technology and hence the third game in the series sees Torus taking over development from Stainless Software. Although the new engine does make a difference, notching up twice the original frame rate, you need a hefty 3D accelerator with 32MB of video memory to reap the full benefits.

The most substantial changes have been made to the premise of the game. Carmageddon TDR 2000 claims to create a 'totally immersive environment'. This means you get a plot, more props

and places to explore. The story is that in the near future humanity is divided into the super-rich and the super-poor with the former creating exclusive enclaves. In



tactical nuclear strike to finish them off. It keeps the scum at bay but creates a mutant world run by gangs and infested with zombies. Your objective is to break out from this hell-hole and reach the high-life.

In this Campaign mode you begin with a Carmageddon race around a desolate zombie-ridden Universal Studios. As always, the opposition cars come in all shapes and sizes, from bath tubs to ice-cream vans, and extra points are awarded for zombie kills and using the various ramps for outrageous stunts.

Carmageddon TDR 2000 differs from a direct sequel by giving you set tasks and missions to complete in order to escape to the next level. For example, you may have to find a bomb to blow your way out or start up a mechanical King Kong. To help you along you have an in-game radar, regular text updates about your next move and a strict time limit. Overall, the idea works with the well thought-out missions offering a welcome relief from driving around in circles. However, the car can be hard to manoeuvre into tight spaces and with stringent time limits it can become frustrating.

However, the game can still be played in its original all-or-nothing, race-for-your-lives format, and this is where most of the fun is.

The original Carmageddon did a lot to give the tired racing genre a new spin and succeeded due to its simplicity. It is refreshing to see Carmageddon TDR 2000 attempting to do the same by introducing a storyline and, although it is not as revolutionary as the original, it works.

However, the uncomplicated racing concept remains the most fun and with improved graphics and a thumping soundtrack it will satisfy the joyrider inside everyone.

ANDY GORDON

DETAILS

★★★★

PRICE £29.99 inc VAT

CONTACT SCI 020 7585 3308

www.sci.co.uk

SYSTEM REQUIREMENTS Intel Pentium II 266 or higher; 32MB of RAM; Windows 95/98; DirectX 7-compatible D3D accelerated graphics card; 210MB of hard drive space; DirectX 7-compatible sound card; eight-speed CD-ROM; 200MB swap file

Football Manager 2001

Have a ball taking control of your favourite team and gambling with your players' stamina

EA has a reputation for getting important licences for games and translating them into top-notch titles. Football Manager 2001 is no exception.

Not only has EA got you the full Premiership league, but it also sports other top flights from around the world, as well as most European sides, including Italy's Serie A and Germany's Bundesliga.

This game scores over other football manager games due to its 3D match engine. No longer do you have to put up with match reports flying in as the game progresses, but you get to watch each match lovingly rendered blow by blow. You can also intervene and make tactical changes or substitutions. Plus you can replay highlights from different angles. And you can get the scores from other matches being played to see how they affect your standing in the league. If you can't be bothered with all this, then opt for the edited highlights or simply let the computer work it out on the spot.

There's a long way to go before you send your side onto the pitch, though, and it all starts with you being appointed manager by the chairman of the team. With the chairman's welcoming email, you are given one of three goals to choose from. The first is the most difficult, but you'll have more money to accomplish it with.

Now comes the management. Each player has his individual stats and needs training, while being kept happy in his contract. This means you'll have to hire staff and supply facilities as well as decide what type of training each player receives.

If you want to buy or transfer players, you'll have to email an offer. Similarly you'll receive offers for your own. Here,

the chairman becomes a safety buffer as, although Del Piero may be happy to come over for £300m, the chairman will put a stop to it with a terse email.

Similarly, in Internet play, this will stop people helping each other out by offering friends players for too little. Scouts

licensed, meaning you get them in every detail. Most of the English clubs have their own grounds, but Juventus, for example, has only a generic stadium. As

more deals are done, so you'll be able to download extra grounds.

You set the ticket prices, make facilities available and decide the state of the stands. Don't start building a new stand at the

beginning of the season unless you're not expecting a big turnout. When you place new buildings you'll have to fit them into a map of the actual surrounding area.

Another major addition is the team-editing suite. You can change a player's stats (yes, you can cheat) as well as shirt, hair, skin colour, race – you can change Inzaghi to look like yourself and, if you're a whizz with Photoshop or

Paint Shop Pro, give him your favourite Aran sweater for a strip.

Whether you want to get your hands dirty or just have fun, Football Manager 2001 offers a great way to head up your favourite team. The detail is superb and gameplay is second to none, while downloads should ensure your teams stay accurate through 2001 and beyond. Football? The greatest game in the world. Football Manager 2001? Likewise.

MATT WHIPP



will also look in youth teams, or cast their eyes further afield for up-and-coming players that you can nurture.

Another way to give your side the edge is by gambling with the boost option before a game. This means your trainer gives a player a bit of hard graft. It may result in giving that player a boost to his stats, or you may injure him. Even if you're lucky, his stamina will drop and you'll probably have to substitute him in the second half.

The majority of grounds have been

DETAILS

★★★★★

PRICE £34.99 inc VAT

CONTACT EA 0870 243 2435

www.ea.com

SYSTEM REQUIREMENTS 300MHz processor; 64MB of RAM (128MB for Windows 2000) 800MB of hard drive space; four-speed CD-ROM; Riva TNT or equivalent graphics card



Infestation

Armed with a versatile dune buggy, you have to rid colonies of alien craft – but mind the water

David Braben's *Infestation* puts you at the helm of an ACAM, an all-terrain armoured dune buggy that you can modify into a range of other weird machines: from skimmers to helijets. You are charged with the task of clearing insect-like alien craft from various planets and freeing up your colonies. It may not appear revolutionary – cars with guns arcade-style – but the machines have great physics written into them and they take quite some driving, particularly over the undulating stellar landscapes.

Single-player gameplay takes the form of missions and, although there is an obvious path to take to accomplish them, there's nothing stopping you from taking a cross-country route. The landscapes are huge and you may come across other weird alien beings that, while not openly hostile, are best avoided.

The other thing best avoided is water. You can upgrade your ship at a factory and get inflatable tyres, which will get you through shallow spots, but for this



you have to collect tokens and crystals. There are other upgrades available too, such as a turbo boost and there's a huge arsenal of weapons to add to your guns and grenades. There are also crates that contain similar goodies.

However, a factory will be no help unless it is manned, but you can carry scientists that you beam down to defunct factories to make them productive again. Scientists sometimes carry useful information as well and you can beam them up by driving close to them.

Combat boils down to charging in, firing at anything you can lock onto, and

then getting straight out again before you take too much damage. It's difficult to aim as you're always on the move, so a hit-and-run policy is generally in order. It would have been better if a bit more accuracy was involved.

Infestation works because it combines arcade action with brilliantly modelled vehicles that are rewarding to drive. There are also some wonderful multiplayer options – moon buggy football, anyone? Only the slightly mundane combat denies it a fifth star.

MATT WHIPP

DETAILS

★★★★

PRICE £19.99 inc VAT

CONTACT Ubisoft 020 8944 9000

www.ubisoft.co.uk

SYSTEM REQUIREMENTS Pentium 166; 32MB of RAM; DirectX 7-compatible 3D card; Win 95/8; 650MB hard disk space

Arcatera: Dark Brotherhood

A tale of bandits, cults and fantasy adventure fails to impress because of point and click controls

If you thought the point-and-click adventure was dead, think again – this is a murder mystery set in a fantasy land where the cursor is your only guide.

The story centres around Senora, the capital city of Arcatera. The guards have finally captured notorious bandit Rog Gwenuar, who had been terrorising the people. However, a movement called the Black Sun – reputedly led by the evil Black Lords – has been growing within the city and if Rog isn't released then war would probably follow.

The choice of characters is standard fare for a role-playing game – the fighter, thief, monk and magician, with all of the usual strengths and weaknesses. Each of the characters has an opening movie to set the scene and they all have their reasons for uncovering the cult and putting a stop to its plans. Whichever profession you choose, the others will join your party later to aid your quest.

The game is a little clunky to play

and the need to click on anything to perform an action quickly becomes annoying. It can be difficult to click on a person to speak to them without accidentally walking off a screen instead. Additionally, some commands are so obvious they should have been automated. When you push a lid off a box you expect to see the contents, but instead you have to click on the box again and then click on the eye symbol to see what's inside.

One area in which the designers have used their common sense is the automatic notepad, which keeps track of what has been said and files information under different headings. This saves you a lot of trouble if you leave big time periods between playing the game.

Arcatera gets 10 out of 10 for effort, but it is ultimately disappointing and the blame can be laid at the door of the slow and pointless point-and-click control.

MATT CHAPMAN



DETAILS

★★

PRICE £29.99 inc VAT

CONTACT Ubisoft 020 8944 9000

www.arcatera.com

SYSTEM REQUIREMENTS Pentium II 233 processor; 32MB of RAM; eight-speed CD-ROM; sound card; Windows 95/98; DirectX 7 (or higher); 600MB of free hard disk space



WIN

This month PCW has 17 prizes up for grabs! Thanks to Iiyama, Microsoft and Eidos 17 lucky PCW readers have the chance to win any of these fantastic prizes: an LCD flat panel from Iiyama, a copy of Microsoft's Windows ME or, for games lovers, Eidos' latest offering Sydney 2000



Two 15in LCD flat panels from Iiyama are up for grabs. The 3813 is an active matrix TFT LCD, offering a clear, crisp display that is free from distortions and misconvergence, with the added features of low power consumption and minimal emissions output for sensitive environments.

The space-saving LCD monitor is

capable of displaying resolutions of 1,024 x 768 full screen, and its ability to produce unlimited colours makes it perfect for displaying a wide range of applications. Auto setup and font smoothing controls ensure instant screen configuration.

We also have five copies of **Sydney 2000** for the runners-up. To celebrate the Sydney Olympic Games, Eidos has created a graphical showcase bringing every aspect of the Olympics to players around the world. So even if you weren't able to make it all the way to Australia you can still recreate the atmosphere of the games. Offering the most comprehensive event listing for a multi-sports game ever, no detail has been spared to recreate the running, the jumping, the cycling, swimming and many more events

■ *For a chance to win an Iiyama flat-panel monitor or a copy of Sydney Olympic Games 2000, just answer this simple question and follow the 'How to enter' instructions on the opposite page.*

The size of Iiyama's flat panel screen is

- 1) 17in
- 2) 19in
- 3) 15in

PCW November 2000 Iiyama/Eidos competition entry form

Name:

Email address:

Daytime telephone number:

Address:

Answer: The size of the Iiyama flat-panel is:

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one of 17 great prizes in this month's bonanza

Ten lucky *PCW* readers could win the latest version of Microsoft's operating system Windows Millennium Edition.

Windows ME provides an easier, more intuitive and stable computing experience. New features include System Restore, which enables users to roll back their PC software configuration to a date or time when it was working properly; and System File Protection, which prevents the accidental or unauthorised overwriting of critical system files.

Using PCs to do more with pictures, video, music and games is becoming increasingly popular among home PC users. Windows ME provides features in each of these areas, including Windows Image Acquisition (WIA), which helps users transfer digital images from digital cameras, scanners and other WIA-compliant devices; Windows Movie Maker, which provides users with the tools to digitally edit, save and share home videos; Windows Media

Player 7, which offers one powerful, easy-to-use place where users can find, organise and play digital media; and DirectPlay Voice Chat, which allows PC gamers to talk with one another across the Internet during gameplay.



Windows ME further enables the 'connected home' through the Home Networking Wizard, a feature that helps users quickly and easily find shared resources and connect them.

Windows ME will offer the best Internet experience for families by providing enhanced features for doing the things that matter most to them: browsing the Internet, shopping online, sending and receiving email, playing games online, doing basic web publishing, and chatting or conferencing with friends and family.

See also our review of Windows ME on page 128 of this issue.

■ For a chance to win a copy of Windows ME, just answer this simple question and follow the 'How to enter' instructions.

What does 'ME' stand for?

Philips monitor winners

The winners of September's competition are Robert Hebden from Doncaster, R Palmer from London and A Smith from Warrington. They each win a Philips Brilliance monitor.

How to enter

Fill in the coupon(s) on the left and send to the following address by 30 October 2000:

November competition
(NB PLEASE SPECIFY MICROSOFT OR IILAMA/EIDOS)

Personal Computer World
VNU Business Publications,
32-34 Broadwick Street,
London W1A 2HG

Or email your name, address and daytime telephone number to us at pcw_competition@vnu.co.uk

Please state in your email if you DO NOT wish to receive information about other products and services from VNU Business Publications Ltd, and if you DO want your details to be passed to other carefully selected companies for marketing purposes.

◆ Competition open to UK residents only

Rules of entry

This competition is open to UK readers of *Personal Computer World*, except for employees (and their families) of VNU Business Publications, Iiyama, Eidos and Microsoft. *PCW's* Editor is the sole judge of the competition, and his decision is final. No cash alternative is available in lieu of prizes.

PCW November 2000 Microsoft competition entry form

Name:

Email address:

Daytime telephone number:

Address:

Answer: ME stands for:

• Please tick here if you DO NOT want to receive information about other products and services from VNU Business Publications Ltd

• Please tick here if you DO want your details to be passed on to other carefully selected companies for marketing purposes

Square dances

London's popular Nunnery Square Market attracts many different street entertainers to amuse the holiday crowds. From the following information, can you discover the nature of the five performers' talents, whereabouts in the Square each is and the sizes of their respective audiences?

Clues

- Carly is on the south side of the Square; she doesn't have an audience of 80 people.
- The smallest audience is watching the performance in the centre of the Square; it isn't the unicyclist, and the unicyclist isn't Darren.
- The crowd of 120 people is either on the east or west of the Square; they're not watching Wizzo the Magician.
- The juggler is entertaining people on the east side.
- Danny has the biggest

audience; he's not on the north side.

6 Neither Lisa nor the tumbler has more than 100 people watching them; Lisa is not on the north side of the Square.

Find the solution to this puzzle for a chance to win a copy of Microsoft Encarta Reference Suite 2000.

	Centre	East side	North side	South side	West side	Juggler	Magician	Mime artist	Tumbler	Unicyclist	30	60	80	120	140	
Carly																
Danny																
Darren																
Lisa																
Wizzo																
30																
60																
80																
120																
140																
Juggler																
Magician																
Mime artist																
Tumbler																
Unicyclist																

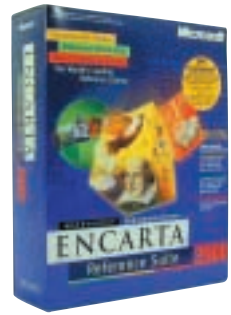
Send the answer, along with your name and an address where you would like the prize to be mailed, on a postcard to:

PCWPrize Puzzle (November 2000), VNU House, 32-34 Broadwick Street, London W1A 2HG, or by email to: letters@pcw.co.uk.

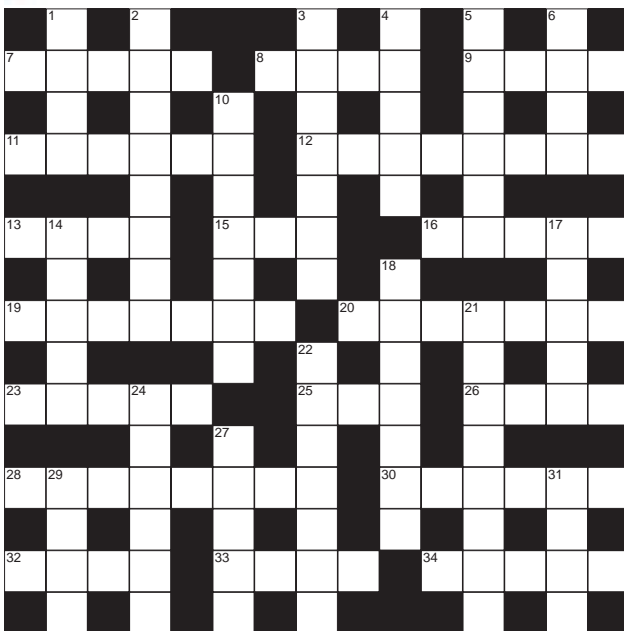
Answers should arrive no later than 20 October 2000. Please note that we DO NOT open attachments.

August's Prize Puzzle answer

The solution to August's puzzle is below.
 Z=20 (A=4, B=12, C=8, D=22, E=2, F=26, G=15, H=16, I=10, J=25, K=7, L=9, M=14, N=3, O=5, P=19, Q=23, R=1, S=17, T=6, U=11, V=18, W=21, X=24, Y=13)
 Congratulations to the winner Peter Wilson of Guildford.



prize crossword



ACROSS

- Net __, Internet filter (5)
- Erase an entire hard disk (4)
- Data storage method (1,1,1,1)
- Reverse monochrome

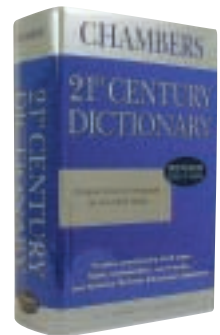
display (6)

- Capable of being retrieved but not changed (4-4)
- Denoting communication over distance (4)
- __ around, cause text to flow (3)

- IBM's electrical pathway (1,1,3)
- Tabulating (7)
- Mb in full (7)
- Keyboard bashers on drugs? (5)
- The fly in the system? (3)
- Colour tint (4)
- Row over an independent variable? (8)
- __ distribution, bell-shaped graph (6)
- __ writer, handbook author (4)
- Silicon __, integrated circuit (4)
- __ hole, gap near floppy's centre (5)

DOWN

- Agony (4)
- Return on money lent (8)
- Tide (7)
- Traffic hold-up (5)
- Test run (3,3)
- Slay (4)
- Eyeing intently (7)
- Gives out (5)
- The U of TGWU (5)
- Pleading (7)
- Changing (8)
- Refrain (from alcohol) (7)
- Outlines, drafts (6)
- Soft-skinned fruit (5)
- Regretted (4)
- District (4)



Each month, one lucky PCW Crossword entrant wins a copy of the Chambers 21st Century Dictionary.

The winner of September's crossword puzzle is: Mr R Baxter from London.

This time, it could be you. Send your completed crossword to: 'PCW November - Prize Crossword', VNU House, 32-34 Broadwick Street, London W1A 2HG, to arrive no later than 20 October 2000.

• Please state clearly on your entry if you do not wish to receive promotional material from other companies.

Solutions to Sept crossword

Gremlins last month mischievously printed the wrong answers, so here are the correct ones for September. Apologies for any confusion.
 ACROSS: 7 Resolution 8 Axes 9 Freeware 10 Screen 11 Cookie 13 Dot.coms 15 Clients 17 Central 19 Routers 21 Serial 24 Savers 26 Platform 28 Bugs 29 Attachment
 DOWN: 1 Metrical 2 Bolero 3 Pupa 4 River 5 Inns 6 Redeem 8 Apricot 12 Inter 14 Obese 16 Esteems 18 Alluring 20 Opaque 22 Infamy 23 Spate 25 Seal 27 Arch

What do chip-implemented chickens, BACS and marrows have in common? Read on to find out

20 YEARS AGO November 1980



Key figures, including *PCW*, realised that our future survival as a nation depended upon widespread computer literacy. Our cover focused on this theme, with an image of a

family representing the community, and a feature on this issue described as 'probably the most significant article ever published in *PCW*'. Though this sounds dramatic, the advance of technology was inevitable and the article tackled ways to introduce the public to some basic truisms of computers. It described ComputerTown UK, a voluntary organisation manned by PC enthusiasts and aimed at children.

Up for bench testing was the latest offering from Japan, the SBS-8000. *PCW* hoped this PC would do for computers what Japanese technology had already done for the hi-fi and TV. It wasn't quite as revolutionary, but was a well-made machine with a fairly powerful Basic language, as well as taking an interesting step towards the multi-user system with its ability to partition memory.

Finally, a pictorial round-up of the *PCW*Show offered views from some youngsters featured in this issue. It appears that there was also some confusion over the magazine's name, with a presenter from London Radio dubbing us Personal Computer Show, according to Sarah Walton, though when he eventually got it right he emphasised the word World with pouting lips.

15 YEARS AGO November 1985



This month's cover featured a rather unusual acorn containing what looked like the architecture found in a processor. This was in reference to Acorn's

work on super-fast processors using Reduced Instruction Set Chips (RISC). Dick Pountain went behind the scenes at the Acorn labs to investigate the Acorn ARM processor based on this instruction set. Using 25 registers and a highly pipelined architecture it achieved 3MIPS (million instructions per second) from a small (7mm square) chip. This step up in

performance was a result of the 'reduced' instruction set's shorter data paths. In addition, when implemented onto silicon, the RISC required less space thereby freeing up room for more registers that could perform operations without memory access. This was a way round the so-called 'Von Neumann bottle-neck' (the limited speed with which a processor could access its memory).

Elsewhere in the issue we gave the low-down on all the sights and sounds at the *PCW*Show in Olympia. While badge checkers were busy keeping the kids out of the business hall, Apricot was exhibiting its new colours with the F2 and F10, both of which came with Digital Research's user-friendly GEM front end. Next to Apricot was Philips and its 'YES' budget micro. Apparently the name 'YES' was arrived at after intensive research.

Meanwhile Chip Chat told of a bizarre breakthrough where chip-implemented chickens could be linked to a Commodore micro or IBM PC. At the press of a button, they produced eggs almost twice the size as those from chickens that had not received the upgrade.

10 YEARS AGO November 1990



Mac lovers will be pleased to know that a decade ago *PCW* succumbed to the Apple Macintosh range and dedicated the cover and bench test to reviewing the

favourites and the latest additions. The test centred on the new release of three Macintosh machines, The Classic, the LC and the IIsi. These were aimed at the lower end of the market, answering the criticism that Apple's marketing strategy was elitist and the company was not producing any entry-level machines. The Classic, the LC and the IIsi started at a competitive £595 compared to the old minimum of £995. Unfortunately, as *PCW* discovered, some design aspects had been sacrificed to meet target prices, which affected performance, however it was a start.

A decade ago we also took a peek at the ground-breaking Sony PalmTop and wondered about the future of computing in the palm of your hand. Unfortunately, the language of the PalmTop was Japanese so, although it was promising, it didn't offer a credible option at the time. Not only would it need to be heavily

westernised for sale in the UK, but it also needed improvement on the hardware front; it was hardly high tech, with processing power provided by a humble 68000 with less than 1MB of RAM. However, as Guy Swarbrick argued, it did prove that it's possible to produce a useful computer that can be carried around easily.

5 YEARS AGO November 1995



Five years ago, laser printers graced the cover as *PCW*'s Gordon Laing put the latest lasers to the test. Rock-bottom budget printers for around £300 dominated the

group test as *PCW* tested some of the first lasers that didn't exceed the average reader's price range or desk space. We also took a look at mid-range lasers costing around £600.

Panasonic's KX-P6100 came up trumps, winning the Editor's Choice in the budget category, with NEC's Superscript 610 following closely with a Highly Commended award. Hewlett-Packard's LaserJet 5P won the mid-range, due to its resolution performance and IrDA-compliant infra-red port.

'Praise the net' was the title of one of our features, as we took a look at the increasing number of religious congregations to be found on the net. At the time five Church of England dioceses had set up their own pages on the Internet in order to spread the Christian message to a wider audience. They were hoping many more sites would follow. Reverend Steele, interviewed for the feature, saw the Internet as a natural progression for the church as the Christian faith fought it out with other religions to recruit future generations of followers. Five years later it can be safely argued that the Church of England has not grown to be a large part of Internet life

On a lighter note, Chip Chat led us up the garden path with an image of a large marrow dominating the page. It seems the establishment of BACS and its helpful website had not gone to plan, with the directdebit.co.uk site not having anything remotely to do with your bank account. The address in fact led you to a gardening site extolling the virtues of fruit and veg!

CLAIRE MORLEY AND JALAL WERFALLI

Sharp MZ80K

The first PC to nail word processing soon found itself at the hearts of small businesses and people

Even in an age marked by rapid change I find it remarkable that, although still short of my dotage, I can boast that I did university on a slide rule. Back in the 1960s there were no solid-state calculators, transistors were considered daring and we could spend a day working out the results of a simple experiment.

The only computer I saw was a circuit board that could be configured to produce an electrical analog of physical phenomena. Many of my fellow students walked into well-paid coding jobs that were soon going begging. But for most of the rest of us digital computers were remote objects of awe.

So I could hardly believe my luck when, in 1981, I was handed a Sharp MZ80K on indefinite loan for a writing project. I soon discovered that what I was writing on was far more interesting than what I was writing about. Indeed, without exaggeration, I was obsessed with the machine for months. Even when I understood how the MZ80K worked, it still seemed utterly awesome.

Reviewed by the infant *PCW* in 1979, it was one of the first affordable (£460 ex VAT) desktops to be used in earnest by UK businesses. It boasted a 10in, 40 x 25-character monochrome screen, a cassette deck and an extended keyboard with an alarming array of extra graphics keys – superfluous, as it turned out, given that you could remap the standard keys.

Sharp made a big mistake in believing it could corner the market by creating its own standard with the MZ80K (something IBM did by accident with the PC two years later); it even went so far as to eschew ASCII to represent text, so that all the data needed translating for the outside world.

The machine came with 24KB of RAM, a rudimentary operating system on ROM and an 8bit Sharp LH-0080 processor that was a clone of the

famous Z80. It was clocked at 2MHz as standard, but the one I used had been upgraded to 4MHz and 48KB of RAM. Sound was limited to a single channel with a three-octave range.

The MZ80K was astonishingly useful. The word processor, WordPro, could cope with up to 20 pages of text at a time and provided most of the major features that we now take for granted – plus one or two others (such as a numbering function) that some

step to learning Basic with its initially cryptic PEEKs and POKEs at individual memory cells. Unfortunately, Basic was not stored in ROM. You had to load it in from tape each time you wanted to indulge in a spot of programming.

The MZ80K had its problems, of course. The tape drive was tiresomely slow and there was no serial port. It did have a single bus extension and later Sharp introduced the MZ80 I/O Port device. This was quite a heavy, bulky device that could support up to five boards (floppy controller, EPROM programmer, Centronics, etc). A parallel interface was also later developed to allow the MZ80K to talk to Seikosha printers.

The slow performance of the tape drive could be bypassed by shelling out for the floppy drive add-on.

This took double-sided 5.25in floppy disks that had a capacity of 143KB. Sharp also

produced two follow-ups to the MZ80K. These were the MZ80K2 and the MZ80K2e, but I've never seen either of these and have been told that they were both only ever sold in Japan.

However, because of the proprietary nature of the machine, when I finally got to transfer my old WordPro files to a PC, I had to 'print' them to a parallel-to-serial convertor, and then strip out or translate the printer control codes.

Neither I nor my brother-in-law, who lent me the MZ80K, could bear to throw it away and not just because it is a historic artefact. The simple fact is that, to me, it still represents a great era of computing where you had to really get to know your computer closely to get the most out of it. Something that is perhaps lacking in these days of faceless grey boxes that need to be upgraded every six months.

CLIVE AKASS



better-known programs did not implement for years.

It had two modes: one full-screen showing formatted text and the other split-screen for editing, with the lower part for commands and the upper for a jumble of text and formatting codes.

For a writer for whom cut-and-paste had meant just that – cutting out rewritten passages and pasting them physically over the original – WordPro was miraculous. To take full advantage you virtually had to program it: scripts, for instance, needed a different format for scene headings, scene settings, speaker names and dialogue. Each was preceded by long formatting strings.

I became adept at using markers and Search and Replace to automate this coding and from there it was just a short

Sharp MZ80K emulator for Linux and Windows
www.math.uni-magdeburg.de/~mkoepp/mz800/mz800.html